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Original Contributions.

IS DECALCIFIED NECESSARILY DEVITALIZED DENTIN?

By J. Requa, D.D.S., Rochester, N. Y. Read Before the Rochester Dental Society, May 14, 1901.

In considering this question I do not expect to offer anything new in histology or on the pathological conditions of dentin, but as there is a difference of opinion and of practice among dentists as to leaving decalcified dentin in deep-seated cavities as a protection to the pulp, we will try and get at some facts in relation to the structure of that material, from the researches of those who are considered good authorities, and that have a bearing upon the subject.

In past years many widely different and diversified methods of treatment have been followed for the capping and protection of nearly or fully exposed pulps; the larger number of which were mostly empiric or experimental, and they have, after some show of success and more of failure, passed into disuse.

Some time previous to last year's meeting of the New York State Dental Society, the committee on practice submitted to many prominent dentists several questions, one of which was, "Do you leave decalcified dentin in cavities as a protection to the pulp?" You undoubtedly either heard or have read the report of that committee. However, I wish to recall a part of it to your attention. Those in favor of leaving such dentin were in a large majority, being about 43 as against 12. Dr. J. F. Flagg said, "Most decidedly; the more the better. I adopted this practice at Prof. Robert Arthur's suggestion more than forty years ago, and have never had other than increasing respect for it and increased confidence in it." Dr. S. B. Palmer finds a natural pulp-cap, sterilized, dried and filled with varnish, better than an artificial one. Dr. Palmer evidently considers it dead and past redemption, for he dries and fills it with varnish. Dr. Miller of Berlin answers, "Yes, occasionally; but it must not be partially decomposed or even wholly decalcified. It

must be sterilized and slightly impregnated with a poorly soluble antiseptic, such as thymol." Although Dr. Miller's answer is affirmative, it must be classified with the negatives, as he acknowledges the dentin must not be wholly decalcified, and that condition was not in the text of the question.

Continuing, the committee say, "Our views on the subject are clearly expressed by Dr. Joseph Head, as follows—'I do most unreservedly desire to say that I leave decalcified dentin in cavities where the pulp would otherwise be exposed, and find that such dentin treated with antiseptics not only tends to conserve the life of the pulp, but also tends to take upon itself lime salts that cause softening tissue to harden.'" Among those who do not believe in the practice are Drs. J. I. Hart, S. L. Goldsmith and R. R. Andrews, and those especially who make no exceptions are Drs. Harris, Wedelstaedt and Ottolengui; the latter going so far as to say, "I prefer to expose the pulp if necessary and fill the roots."

Dr. H. Prinz says, "Such dentin has evidently not lost its entire vitality, it is often hypersensitive. A thin layer of such dentin, if left over the pulp and impregnated with some strong antiseptic, will not cause recurrence of decay. It may even be, as seems to be verified by clinical demonstration, that the once softening dentin will reconstruct itself." In the foregoing we see the expectations of many, that decalcified or softened dentin will take upon itself lime salts and harden or reconstruct itself.

A few words upon this point—Dr. G. V. Black, at Buffalo last fall, in an able paper entitled "The Value of Exact Methods in Operative Dentistry," said, "The histology of the teeth was first made out by Tomes, beginning in 1835 and ending in 1860. He made out the structure of dentin, of the enamel, of the pulp, of the odontoblasts and of the dentinal tubes, and his descriptions still stand as correct. The application of the discoveries of Tomes has been very slowly coming about, until to-day we are in a position to use this knowledge as a basis for operating as we have never been able to use it before." I make this quotation for the purpose of emphasizing the following:

Tomes, in his System of Dentistry, published in 1859, page 20, says, "In dentin, which forms the great bulk of each tooth, we have no such thing as outward growth; no addition to the external surface of the formed tissue ever takes place."

Sudduth, in American System of Dentistry, page 592, says, "Dentin is a secretion of lime salts under the superintendency of the odontoblasts—not around themselves, but around their fibrils. The thickening of the dentin is by accretion of lime salts in such a manner as to lengthen the tubuli. The fibrils lengthen as the dentin thickens, and the odontoblasts recede before the forming dentin. The thickening of the dentinal wall is accomplished by a single layer of odontoblasts which begin the process, and these cells persist throughout the life of the pulp; when stimulated by the irritation of invading decay they have the power to throw out a secondary layer of dentin, which acts as a barrier against the enemy. This thickening is at the expense of the cavity of the pulp, and consequently of that of the size of the organ itself."

Black, American System of Dentistry, page 865, says, "Secondary dentin is the result of a new growth, excited by some abnormal condition of or injury to the tooth. It is always deposited upon the walls of the pulp-chamber, and results in the reduction of its size."

If the foregoing be admitted as true, and to-day it cannot be controverted, there can be no such thing as a deposition of lime salts beyond the containing walls of the pulp, either in the formation of normal dentin or of nature's protective substitute, secondary dentin.

Wherein consists the vitality of dentin? Certainly not in the basic principle of lime within its network of gelatin with no circulation and as passive as a piece of marble; but wholly in the persistent vitality of the contents of the tubuli which are destroyed in the process of decalcification, whether that process be considered as purely chemical or as brought about by the invasion of microorganisms or both.

In the formation of dentin nature seems to have recognized the requirement of a substance so dense as to be just beyond the possibility of circulation of blood and of repair, and I have only to add —decalcified is devitalized dentin.

Discussion. *Dr. J. H. Beebee:* I should say, No! in answer to the title of this paper. We all have seen the writhings of patients when the white, leathery substance we call decalcified dentin was removed. If any of us have ever applied a little chlorid of zinc on the surface of such dentin we know enough not to try it again. Even nitrate of silver sometimes causes pain in these cases. If

this decalcified dentin is dead I would ask what makes it so sensitive.

Dr. F. M. Rood: I leave the decalcified dentin in the tooth and cover it with a piece of tin foil and gutta-percha; then pack amalgam over it.

Dr. B. S. Hert: I have always thought that there was feeling in decalcified dentin, as it is not devitalized in many cases. I never leave decayed structure in the teeth, but remove all decay and even the pulp if necessary. When beginning practice I sometimes allowed decayed dentin to remain, but my experience with that method was unfortunate.

Dr. F. L. Sibley: As I understand it, there are only two bones in the body that will reproduce themselves, and this is a specialized bone and cannot do so. It is composed of a certain amount of organic matter. After it is made aseptic I remove certain portions of the devitalized dentin, especially in young teeth.

Dr. F. Messerschmitt: I never destroy the pulp if it can be helped, but usually remove all the leathery structure. The pain is caused by pressure, as the dentin is soft and impinges on the pulp under pressure. Some teeth with large cavities are never sensitive until the excavation comes near the pulp, and if that leathery substance is simply scaled away there is not much pain. I have had good success with Scheuer's paste. It is very sticky and hard to manipulate, so I place a bit of varnish in the cavity near the pulp; then moisten a fine instrument with glycerin, put a small quantity of paste up against the varnish, and drag paste over pulp carefully. When a good coating of that is secured cement can be put on at once.

Dr. Frank French: Formerly the idea was conveyed that a secondary deposit of dentin could be induced. I recall one case of a first molar in the mouth of a man thirty-five years old. In excavating more of the leathery substance was removed than I had intended, and the pulp chamber was exposed. I dried it as carefully as possible, saturated the whole cavity with hot air, and applied oxyphosphate of zinc. After this was hard the tooth was filled with gutta-percha. Some eighteen months later I took the gutta-percha out and found under the little cap of cement a secondary deposit of dentin, closing up the pulp-chamber. I filled the tooth, and it is to-day alive and doing good service.

Dr. H. S. Miller: I am heartily in favor of leaving a coating

of organic matter under certain conditions. It seems to me a great deal depends on the length of exposure, and probably more failures arise from the fact that the pulp itself has become diseased. Where the pulp is alive and healthy, however, it should be left. I do not believe that the decalcified dentin is dead.

Dr. Requa, closing discussion: Discussion ran largely on what cap should be applied, which was not the subject of the paper. I neither advocated nor opposed the idea that such dentin could never be reconstructed or hardened. Even in decalcified dentin it might be, as the tubes could be left and not be wholly decalcified. Even if they are in a perfect state of health, lime salts cannot travel up over them, and I tried to show that they never went beyond the containing walls of the pulp. I also tried to show that no lime salts passed beyond the walls of the pulp in the formation of dentin, and recalcification or reconstruction is a myth. Decalcified dentin is sensitive because vibration or pressure is communicated through it to structure which is sensitive.

FIRST MOLAR NECESSARY TO DENTISTS' FINANCIAL SUCCESS.

By C. M. Wright, D.D.S., Cincinnati.

Twenty years ago a dentist of fine address and education, of refined tastes, cultivated by study and travel, with a large practice among the creme de la creme of the city in which he was located, accompanied me to a dental society meeting, the first he had ever attended. The subject under consideration was, "Shall the Sixth Year Molar be Preserved"? Shortly before that time Dr. Atkinson had suggested, that if for any cause early in a child's life one of these molars had to be sacrificed, it might be well, in order to preserve harmonious facial development, to extract the remaining three teeth. The question was warmly discussed pro and con, and purely from scientific, surgical and esthetic standpoints. After the meeting, as my friend and I were discussing the menu at the hotel, I asked him if he had not found the meeting interesting and profitable. His reply gave food for thought as a broad business view. Said he, "I was disgusted with the whole affair. I never listened to such stuff. Figure it out for yourself. The sixth year molars are particularly liable to decay, and each one may develop five or more cavities on the different surfaces. Let us say

five, then we may expect to be called upon to insert four times five fillings in each patient's sixth year molars. Each filling, we may say, will be worth $4. Four times twenty equals $80 for each patient's four first molars. Supposing a dentist has but one hundred patients each year who require these operations; one hundred times $80 equals $8,000. Supposing that there are 20,000 dentists in the world who have each these one hundred patients a year; multiply $8,000 by 20,000 equals $160,000,000, and you have that amount lost to the dental profession each year by the extraction of these sixth year molars. Bah! no wonder dentists are poor."

My friend retired from practice after twenty years of devotion to his work and lived ever afterwards like a gentleman.

HELPFUL HINTS.

By C. F. Rodgers, D.D.S., Conneaut, O.

Use a saturated solution of salicylic acid in alcohol for canker sores, drying the gums well before applying.

If pins become loose in a vulcanite tooth, and you wish to replace same, flow a little thinly mixed porcelain body around them and bake in furnace.

In extracting roots which are decayed nearly to the top, leaving a mere shell, cut a soft pine peg to fit tightly in the root, drive to place and extract, when the stump will come with it.

Fusible metal is excellent for temporarily fastening a tooth on vulcanite plate. Dovetail well and hold tooth in place with moldine, pressing the metal in with hot wax spatula.

If point of tooth is broken off and you have no tooth in stock to match, remove the broken tooth from plate, build out with proper shade of enamel and bake. Broken blocks also can be neatly repaired in this way.

A lateral inside of arch, but directly back of its proper position, is a common occurrence. Fit a gold cap to the lateral, then back up a plate tooth, wax against the cap while in position, remove, insert and solder backing to cap. Look out for the bite.

One of the greatest conveniences in my laboratory is a block of hard wood, thirty-eight inches high and twelve inches square, on the right and left sides of which, flush with the top, are shelves eight inches wide. This block cannot be excelled for swedging of all kinds, as it gives a large, solid surface.

It is often the case in bridgework that the gums are so receded that the teeth must be made longer than were the original ones, so that when patient smiles about an inch too much tooth is shown at the necks. I have found that a very pleasing effect can be obtained by baking pink gum enamel on the necks of the teeth to correspond with the gums on the surrounding ones. If the teeth have been accurately fitted to the gums this work will hardly be noticeable. It also answers well for crowns. If it is done after the bridge is made, invest so that all gold is covered, just allowing the necks of the teeth to show.

To make a simple crown, prepare the root a little long at the back, well under the gums in front, burnish a piece of 34 or 36 gauge platinum, cut a little larger than the root, well over the end, lapping the edges well over the end, punch a hole directly over the canal, and in this hole insert pin, 17 or 18 gauge. Select a plain rubber tooth and fit to place, allowing the pin to pass between the pins on the tooth under the heads, bend the pins together so that they will grasp the pin tightly, wax all together and invest all in mouldine, pin side up. Melt out wax and solder all with as little pure gold as will just hold the different parts together. Place in investment material, build up well around the pins with low fusing body, mixed rather thin, dry well with spunk, and bake in furnace. After cooling, build on more body until the crown is properly contoured, and bake to a glaze.

THE REAL ATTITUDE OF THE DENTAL SPECIALTY TOWARD MEDICINE.

By Frank W. Sage, D.D.S., Cincinnati. Read Before the Cincinnati Odontological Society, April 26, 1901.

Before the recognition of dentistry as a specialty of medicine in the year 1892, thoughtful, ambitious men in the dental profession had long been turning this way and that, with expressions of intense yearning for relief from restrictions felt to be humiliating to an honorable profession. In dental meetings the question kept recurring, "Is dentistry a profession?" It was as if the dentists, having organized themselves into a nameless *something*, and having arrogated to that something the name "profession," had come to doubt whether fact and public sentiment sustained them in the position assumed. There was a half-appealing attitude toward the

medical profession for assistance in raising dentistry to a proper level. Frankly expressed, this appeal might have been worded thus—"What can we do to make our poor, nondescript, half-fledged profession respectable, and ourselves, its members, respected?" This refrain sounded throughout every discussion in the dental societies. Whether the theme discussed was the education of the public—that ignis fatuus of the dental convention—the relation of dentistry to medicine, or the preparation of the dental matriculate, the same familiar plaint constantly recurred. At the same time the attitude toward the medical profession was half defiant. It was the fashion for members who could think of nothing else to say, to arraign the physician for his presumed ignorance of dental science.

When recognition came, however, all this was instantly changed. A few independent spirits indeed were for repudiating the proffered honor, holding that dentistry had given as much to medicine as it had received. In the end, however, they waived their objections and joined in the general congratulations. Dentists everywhere felt an accession of dignity which took little account of the fact that in recognizing dentistry as a specialty of medicine the Medical Association in session at Washingtion had not proclaimed all dentists to be medical specialists.

While the result of that recognition was to greatly stimulate the dental profession, inducing many already in practice to take the medical degree, a large number of intelligent, capable men in the dental profession maintained that dentistry is nevertheless a distinct profession, developing its peculiar resources along lines which rarely, or at least only in a measure, converge toward those on which medicine progresses, and that it serves its patrons in ways and by means wholly foreign to those physicians employ. To the present day this view prevails with not a few. The situation is peculiar, unprecedented, significant of an anomalous relationship of dentistry to the parent stem, curious and interesting to the last degree. How did this come about?

The dental specialty, springing originally from medicine, as did all other medical specialties, seems to have required to be grafted upon another stock or, to extend the figure, to be even transplanted to another bed supplying nourishment of a description wholly different from that which served for the development of the other medical

specialties. In one or two respects only the dentist's service to his patient resembles that of the physician or the surgeon. He may exhibit remedies or employ surgical interference, but this office may be merely preliminary to a peculiar service which is to follow, something wholly extraneous to medical science, while the physician's ministrations begin and end with a prescription. Herein is dentistry unique. No other specialty of medicine furnishes its counterpart. No other specialty could have so developed along lines of its own selection, appropriating empirically such principles of practice and such remedies as suited its purpose, and yet finally attain a success practically untainted by empiricism. In earlier days the dentists, perplexed and unable to solve pathologic or therapeutic problems, either stumbled helplessly over them or passed by on the other side, finding them after all not absolutely essential. What knowledge the dentist acquired of materia medica, pathology, and other branches of medical science, he got by inductive processes, formulating no principles covering classes of cases in practice. Yet despite these drawbacks of ignorance, the science and art of dentistry have finally rounded out to the proportions of a legitimate specialty of medicine. What less than a miracle is this?

Conceive if you can of the oculist attaining to perfection of skill after the manner in which the dentist of seventy or eighty years ago set about to learn dentistry. Imagine a man dropping his carpenter's plane to enter the office of an oculist of acknowledged skill, with a view of learning to be an oculist. He buys a copy of "The Principles and Practice of Optical Science," into which he occasionally dips, when in difficulty. His main reliance for information, however, is in watching his "preceptor" and imitating his processes. We see him remove crystallin lenses for patients, and retinas, and we observe that the patients go away evincing no consciousness of having suffered irreparable loss, but rather seem joyous over their relief from pain. Now we see our student working hours fashioning glass eyes, which later his "preceptor" inserts for a waiting patient. We hear him say, "You must persevere in using these, and before long you will be able to see with them quite as well, if not better, than you ever could with your natural eyes." Later we see the preceptor operating hour after hour for another patient, repairing a natural organ. "You should remember, sir, that one natural eye is worth a dozen glass ones," he replies to the

patient's remonstrance against the exorbitant fee. Such it seems is the duplicity of oculists!

Now further picture the student after two or three years' instruction under this able teacher pursuing practice on his own account, year after year accumulating fame and honors. Failures he occasionally has, but no death is ever charged to him, no whisper of malpractice ever assails him. This picture, preposterous though it seems, needs only slight retouching to pass for a faithful presentment of the dentist's schooling not so long ago. It must appear that the oculist could never so much as make a start in the direction of success unless he had first traversed the entire field of medical science. He must be competent at the outset to trace from symptoms disclosed in the eye such disorders as syphilis, paralysis, locomotor ataxia, the various anemiae, and other diseases. His patient knows without special prompting that irreparable loss may follow the slightest error of diagnosis or treatment, while the popular estimate of the dentist's responsibility is expressed in a wide-spread belief that he can fall into no error which a pair of forceps deftly wielded will not correct.

It appears then that the comparative unimportance of the dentist's service, for one thing, accounts for the fact that dentistry has so long been left to its own resources, but an element liable to be overlooked has had much to do with the dentist's confining himself to so comparatively narrow a field. It is the time required for the service rendered. While the oculist may wait on ten to a hundred patients daily, and still spare time for hospital work or the lecture room, the dentist may be all day long treating and filling two or three teeth for a single patient.

Here then are facts which seem to account for the present attitude of dentistry toward medicine; an attitude not lacking in friendliness, yet expressing, as many believe, a feeling of incompatibility. The dentist who is of the fibre to be a leader among dentists is essentially mechanical in his instincts. He may possess the instincts of the physician as well, but his bent is mechanical. Whatever is to be done for improving the status of the coming dentist will fail of its purpose if it be not kept strictly in mind that he must remain a dentist. It is possible that the question of affiliation with the medical faculty must be relegated to the rear, in considering what the crying need of dentistry actually is. No mere sentiment

referring to the elevation of the profession by factitious means is to be considered. We cannot dignify dentistry by making it over into something else, even though that something else be medicine. Dentistry needs no dignifying. Its individual members through their individual personal influence confer upon it or withhold from it the only dignity worthy of the name. The public cares nothing for us as a profession; it takes cognizance of us only as individuals, or as groups of individuals, and chooses from among us such as it deems best qualified to minister to its peculiar needs. But the age of superstition is not fully past; the occult in medicine has had much to do with the physician's being esteemed above the dentist. Even that, however, is passing; so great a man as the lawyer, once supposed to outrank all other professional men, has come to be irreverently spoken of and to have his fees criticized.

The true standard of respectability in any profession is an individual standard. The dentist who is by nature, education, and breeding worthy of the respect of his patrons usually finds no occasion to lament that his profession is not respectable. He may regret moving along a narrow path, but he has no vain yearnings after the merely adventitious aid of a title. The attitude of dentistry toward the medical specialty is a composite of the attitudes of its thousands of individual members. One dentist expresses in his attitude a genuine desire to know more of medicine in order that he may do more and better for his patients. A second is impelled by pride to seek a more honorable degree than that of D.D.S., having a regard for the prestige the title may confer. A third cares nothing for the mother science. A fourth is openly hostile to the suggestion that dentistry needs any assistance from the medical profession. This composite picture requires to be studied with relation to any and all suggestions for improving the status of dentistry and the dentist. We may rule incompetent men out of the profession, but we cannot rule out temperament or natural aptitude. We cannot coerce men who have a taste for dentistry and none for medicine into the medical fold. These matters the dental college must deal with, for the medical college could not supply to its students a knowledge of dental science, to say nothing of a knowledge of dental art, if the dental college were abolished. Dentistry must be greatly improved, both as to its science and its art. The picture of the rise and development of dentistry portrays after all only a sorry success. The

mischief wrought by unscientific men during those long years of development—who can tell!

The history of all important reforms shows that the exciting influence comes from without the circle of the distinct organization, whatever it may be, but the active agencies by which the reform is set afoot spring up from within the organization. Granting that this picture of the attitude of dentistry toward medicine is a fair presentation of facts, there remains still to be considered the attitude of the public toward both professions. The dentist's patrons are satisfied with his services so long only as they believe them to be the best the science and art of dentistry are capable of supplying, but as a matter of fact they find so much of imperfection in his ministrations that the question of the why and the wherefore of failure is constantly being suggested to him. So that he in turn is constantly asking, How can I improve my services to my patrons? That is, if he is really possessed of the progressive spirit. Which finally brings us face to face with the question, whether the great mass of the profession, including the progressive and non-progressive, are likely to be considered in any proposed measures for improving the dentist's status. Foremost of all questions is, what is the best that can be done for the education of the number of dentists adequate to the popular demand for dentists? It is not perhaps an unfair assumption that the leaders of our profession, those who have done most for the science and art of dentistry, should be the only arbiters of this question. It cannot be delegated to the medical profession to prescribe boundaries and determine final principles on which the coming dentist's education shall be conducted. That falls inevitably to the lot of the dental profession.

Discussion. *Dr. J. S. Cassidy:* The high standing of medical men is not due to any superior knowledge but to the mystery surrounding the remedies and treatment. In early days medical science was far from perfect—fever patients were not allowed water to drink, the sick were not given the food which they required, blood-letting was constantly resorted to, and the methods of treatment were all wrong. I have always believed that a dentist could properly cover his field without going through a medical school. Nevertheless, the more a man knows of medicine the better equipped he is. For instance, in order to give anesthetics intelligently he must know something of physiology and pathology. We cannot consult with

physicians regarding diseases of the teeth, as they are for the most part absolutely ignorant on this subject. I have had physicians come to me and ask to have pulps killed in abscessed teeth. Medical men will frequently treat a dental case for years which a dentist could relieve in ten minutes. How often have physicians and surgeons cauterized for months a running sore, due to a dead pulp in a tooth, which has healed spontaneously after a good dentist fixed it up.

Dr. C. M. Wright: The late Dr. McKellops was one of those who was opposed to accepting the honorary degree from a medical congress. For my part, it does not matter whether physicians acknowledge us as specialists or not, since it is patent to all observers that along certain lines we are one and the same. I agree with the essayist that the respectability of the profession is in the hands of its individual members.

Dr. T. I. Way: One disreputable member of the profession can do more to injure us in the opinion of the public than the example of a dozen reputable practitioners can do to help us.

Dr. M. H. Fletcher: Of all professional men the dentist needs the best equipment for practice, and he must have a medical education in order that he may know systemic conditions, temperament, etc. Without it he may not even succeed in that work which some insist is the principal and sole function of the dentist. At present the dental colleges do not teach pathology thoroughly enough. It is true that individual dentists make their own standard of respectability, but it is also true that the public estimates us according to long recognized standards.

Dr. A. A. Kumler: With a large number of the profession the distraction of studying two sciences and the dividing of individual energy would result in a lessening of the dentist's ability.

Dr. O. N. Heise: It is the individual in dentistry who has established the standard by which the public judges us, which fact gives a peculiar emphasis to the assertion that the dentist must know more in order to be rated higher, for as a dentist he ranks only as a dentist. The important thing is not that he acquire the medical degree, but that he shall be able to manage a case requiring medical knowledge and experience just as well as the physician, for it is seriously to the disadvantage of the dentist that he is ever forced to the necessity of calling in a physician. Dentists need more thorough education, and I do not believe a first-class dental

college compares with a first-class medical college in teaching pathology, physiology, materia medica, etc.

Dr. C. M. Wright: I must protest against the statements of Drs. Fletcher and Heise, that general pathology, physiology, etc., are taught more thoroughly in a medical than a dental school. I teach general—not special—pathology, the broadest kind of philosophical pathology, in a dental college, and find that graduates from medical schools, placed side by side with dental students, rank second to them. Several years ago I refused the degree that these "M.D., D.D.S." men appreciate too highly, because I believed that a dentist need not be ashamed of his calling; furthermore, none of my medical friends would think any more of me for having the title of M.D. These dentists who also hold the degree of M.D. (Mystical Doctor) try to impose on us plain D.D.S.'s and pose as something higher and better. I never advise a dentist to try for the M.D. degree. It spoils him. There is a tendency developed toward encephalic hypertrophy.

TIN—A PLEA FOR MORE CONSERVATIVE METHODS IN FILLING TEETH.

By T. D. Shumway, D.D.S., Plymouth, Mass. Read Before the Vermont State Dental Society, March 21, 1901.

In submitting this subject for your consideration, I wish to disclaim any intent to show superior manipulative ability in the use of cohesive gold, or to merely demonstrate by a novel experiment the possibility of uniting gold with tin by simple contact. If this were the only reason for appearing before you, it would be well not to consume valuable time which could be more pleasantly and profitably employed. I trust that in this society the day has gone by when exhibitions of this character can excite either wonder or admiration. That there have been demonstrations of this sort far beyond the mechanical skill of your essayist to excel or even emulate, no one is more willing to concede than he. It is for the purpose of presenting the hackneyed subject of filling teeth in a somewhat different manner from that in which it is usually treated that the above title was selected and these specimens of the work submitted for your inspection. These specimens are not intended to be like those made with cohesive gold and the mallet. In their physical

construction they are radically different. Whatever value they possess arises from this fact.

Failure of Cohesive Gold.—Had the use of cohesive gold and the mallet met the expectations of the profession, it would be presumptuous indeed to attempt to offer anything in its place. It is true, the skill displayed in the repair of wasted and broken tissue by contouring has been something remarkable. Manual dexterity has reached a high state of development, but the results obtained have been at a fearful sacrifice of tooth structure. History repeats itself, and the same objections to those faults which caused the failure of crystal or sponge gold nearly fifty years ago, apply to any form of cohesive gold when placed in contact with tooth substance by mallet force. In the discussions on the use of crystal or sponge gold it was pointed out what would follow this plain violation of natural law, in impaired or arrested function. In an article by Dr. J. De Haven White, published in the *Dental News Letter* of July, 1854, the writer says:

"It is believed by some that a plug must be impervious to dampness; this cannot be, for if it were, it would not be necessarily a perfect plug; dampness must permeate a plug to some extent, or the dampness will force around the plug and displace it sooner or later. We know well that a distinguished operator in our city loses more hard plugs than soft ones on that account; his plugs are therefore better than the teeth he puts them in. We do not wish to be understood as advocating hard plugs, but we believe the most perfect plug is of about equal porosity to the dentin; with a good cavity it will remain in longer than a harder plug, especially in the lateral portion of the teeth. A foil plug will not be broken up by such permeability, and a sponge plug will. No reasonably good operator loses a plug by softening, but by the margins of his cavity giving away. The constant expansion and contraction of the plug and the tooth will cause any plug to give way sooner or later, and until we get a substance that will expand and contract with the tooth, so as not to loosen its margins, we will have some of our highest specimens of art crumbling away under our eyes."

It is evident that Dr. White had an intelligent understanding of structure and function. As a student of vital energy he was able to discern the cause of failure in the use of crystal or sponge gold. Manipulating cohesive gold by the more modern methods does not remove the objections which he so forcibly stated. The introduction of the rubber-dam made possible operations which before were only

partially successful, but the evil was augmented in a more thorough crystallization of the gold by mallet force.

That many teeth have been filled with cohesive gold and the mallet, and that the fillings have remained for a great number of years, no one will attempt to deny. There are many people that have survived and enjoyed a comfortable degree of health, who have violated the laws of correct living. There is a wonderful recuperative energy in the human organism. But for this it is a question whether the race would not long since have become extinct, by reason of transgression of natural law. Admitting that some teeth which have been filled with cohesive gold and the mallet are doing good service, we believe this is due to the recuperative energy that was able to overcome the contact of a foreign body incompatible with tooth structure, rather than to the influence of the filling itself. With the record of failure, it is fair to say the success of filling teeth with cohesive gold has not been commensurate with the amount of labor bestowed, the physical exhaustion, mental strain, and nervous tension on the part of the operator, together with the pain and suffering the patients have been made to endure. It is significant that crowns, bridges and inlays should follow so closely in the track of cohesive gold and the mallet. It is also significant that those who became the most expert in using gold in this form were early in the field to adopt the later method of cutting off crowns.

Etiology of Tooth Structure.—When the mallet was introduced for the purpose of condensing cohesive gold, it was assumed that because lost tissue could be restored the teeth would be preserved by purely mechanical means. Operative dentistry or the care of the natural teeth, like the practice of medicine, is not an exact science, although it has to deal with scientific subjects. Nature rebels at any attempt to reduce her methods to exact mathematical lines. This is clearly demonstrated by a study of structure and function in tooth development. This study is necessarily prosecuted under difficulty, for no one is privileged to see the secret workings of nature. The microscope can reveal only what has taken place, not what is going on in this workshop. If we could examine under the lens without first destroying the vital force, what secrets would be unfolded! It is by reasoning from what we know that we are able to reach conclusions which are to guide us.

In the discussion of this subject the first inquiry then is, how is

a tooth developed, and what are the changes wrought in this wonderful organ from its beginning to old age, or, in other words, how is a tooth built? At its inception there is the dental arch, in which appears a groove, and across this groove, which divides it into pockets, there shoots a thin porous bone. In the pockets are follicles, which are the germs or buds of the future teeth. These follicles are connected with the circulatory system by arteries from the internal maxillary branch of the external carotid; veins from the internal maxillary vein, which return the blood and terminate in the external jugular; and nerves from the fifth cerebral or fifth pair. Here we see that every pulsation of the heart sends forth the material for tooth formation. Embryologists tell us that at the end of the fifth or beginning of the sixth month of fetal life the process of enamel formation is about to commence. The cells which form the external epithelium or Nasmyth's membrane have performed their function and disappeared. This membrane has a polished surface, and is a covering for the prisms or rods which are to form underneath. These are held together by what is termed a cementing plasm.

Formation of Enamel.—In the formation of enamel is first seen the form of the future tooth in a cutting edge for an incisor, and a cusp for a bicuspid or molar. The enamel organ when completed is a purely crystalline formation, and according to the best authorities is without any trace of organic matter. All crystalline bodies are formed from without inward, and enamel formation can be no exception to this rule. A little reflection will make this apparent. Take, for example, the shell of a lobster or the skin of a snake. When a lobster sheds its shell it is provided with a membrane similar to the outside covering of enamel of the teeth, which is highly polished but extremely tough and flexible. In the process of time there is formed underneath and attached to this membrane a calcareous deposit, crystalline in character, varying in thickness from one-sixteenth to one-fourth of an inch. We can readily see how impossible it would be for the lobster to shed its shell but for this crystalline process taking place from without inward. Nature provided an inorganic covering which acts as a protection during the process of calcareous formation. Suppose the process to be reversed? It would mean simply the death of the lobster. After the new shell is formed another membrane appears, and in due time the old shell is thrown off and the lobster comes forth increased in size. In no

other way could it get out of its environment and expand and grow. What a beautiful sight is a black snake that has just shed its skin—so black and glossy! Now this new skin is pure crystal, and is formed in the same manner as the lobster's shell, only differentiated to meet the habitat of the snake. Nature had to provide an inorganic covering to prevent the snake from being torn and bruised by the stones and bushes over and through which it crawls.

On a cold winter's day watch the process of crystallization on the window pane. It is always from the sides toward the center, and never from the center outward. This is the key that opens the secret chamber of nature and reveals the process of enamel formation for the teeth. When once formed the enamel plays no part in the life of the organ, any more than the lobster's shell or the snake's skin, except to act as a protecting covering. The enamel of a tooth is the only part of the animal economy which does not undergo decomposition or change. Professor R. R. Andrews says: "The finest lenses do not reveal the slightest differences between enamel ground from a living tooth and that which has lain in the ground for centuries."

Formation of Dentin.—The growth of dentin is by a process the reverse of that by which the enamel is formed; that is, its growth is from within outward. Unlike the enamel, it is composed of two distinct parts, minute tubes and a fibrous tissue called the uniting medium. In their arrangement these tubes radiate from a center. Tomes says, "The center of radiation is the pulp cavity." These tubes ramify in undulations not only towards the enamel, but also dip downward to form the root of the tooth. They also extend through the sides of the root and are lost in the cementum.

This fact should have an important bearing in the treatment of pulpless teeth. As yet we have only the framework of a tooth. It is like a house under process of construction, with an outside covering and partition walls. In the work of tooth-building these tubes perform a very important function. They are filled with a substance that is given off from the pulp, which so far as the microscope can determine is amorphous or structureless. This substance, granular in character, changes into a lime salt. This change is going on from the time the tooth is formed until the period of extreme old age, when the pulp almost entirely disappears. There is no part of the human organism where the process of change is

carried on more continuously than that which takes place within the teeth. Although the teeth are provided with an indestructible covering, they are the victims of disease.

From some cause, which it is not necessary to inquire into in this connection, the enamel becomes abraded and the dentin is attacked by caries. Nature has provided for attacks of this kind by making the point where the amorphous substance is changing into a lime salt the most sensitive part of the organ. She at once sets up the work of repair by a secondary deposit of dentin. The sensation of pain which is experienced is not only a note of warning but a cry for help. This cry is for a protecting covering. If the waste is greater than the repair it means destruction of the organ. The more recent investigations have shown that the work of repair goes on even after the pulp has become inflamed.

Dr. A. Hopewell Smith of London, in a paper on "Certain Adventitious Dentin Associated with Inflammatory Conditions of the Dental Pulp," says that "in the majority of the inflammations, but by no means in every inflammatory condition of the dental pulp, there is found a protecting layer of hard adventitious dentin, which is put by caries of the surface in the place of danger; that is to say, opposite the breach." Here we see the effort of nature to protect herself even after the struggle has become hopeless. From this it would seem that operations upon the teeth to stay the inroads of caries should be protective and remedial. The dentist cannot save teeth any more than the practitioner of medicine can cure disease. Nature must work the cure. The aim of operative dentistry should be primarily to assist nature, not a display of mechanical skill in disregard of fundamental law.

Materials for Filling Teeth.—A study of the materials to place in contact with tooth substance is the first requisite, if we would approach the operation scientifically. A crystalline formation is obstructive when placed in contact with a living or fibrous body. No one could expect to ripen apples by filling them with gravel stones. If you should shoot malleted fillings of cohesive gold into the body you would invite blood poisoning. The same law governs in the more dense substance of the dentin, which is filled with life. Again, it should not be anchored with dovetails, angles, retaining pits, etc., as nature is above mathematics and refuses to be bound. This is the reason why Dr. White says, "The filling should expand

and contract with the the tooth" to meet the changing conditions. An amorphous substance which is undergoing a metamorphosis demands that the material to be placed in contact with it shall be structureless as itself.

Success with Tin.—An illustration of this is seen in the way lead or tin becomes encysted when buried in the soft tissue. Of all the materials that have been employed as a tooth stopping there is none which has shown such preservative properties as tin. It has a history and a record as old as operative dentistry. In 1825 Mr. Sigmond of Bath, England, said: "In 1783 I stopped a considerable decay in a large double under tooth, on the outside of the crown or near the gums, with fine tin foil, which lasted for a good number of years." The saving properties which tin exhibits when placed in a carious tooth are well established. The testimony of many skillful dentists bears witness to this fact. The reasons that have been given as to why tin exhibits this property have been numerous and varied. Some have attributed it to a therapeutic property in the metal; others, like Dr. Palmer of Syracuse, claim that it is positive to electro-chemical action, and some, like Dr. Miller of Berlin, say that it is germicidal. When compared with other metals tin may be said to be almost amorphous. Its specific gravity is 7.29; it melts at 442 F., a little more than twice the boiling point of water. Gold is more than four times as tenacious and six times as good a conductor of heat. Under the same conditions tin expands nearly twice as much as gold, but the rate of expansion of gold is nearly twice as much as tin. Here is a metal that in its physical characteristics borders upon the structureless. When tin is placed in contact with the amorphous substance of the dentinal tubuli it acts as an assistant in the effort of nature to protect herself from untoward external conditions. This, it would seem, is the more scientific reason for its benign influence.

The limitations of tin have been the barrier to its general use. These limitations are its color, softness, and the tendency to what is termed oxidation. Various methods have been suggested to meet these objections, one of them being to make a cylinder of tin and gold foil, and then force this into place, either by the wedging process or the mallet, but this method has been only partially successful. Incorporating gold with tin destroyed the attractive appearance of the gold, and the tin would oxidize and wash out when it came to the surface.

Tin and Gold.—The idea of covering tin with gold is not new. It was practiced nearly fifty years ago. The method was to force the gold into a base of tin with a sharp instrument, with the object of simply cheapening the operation. This was the only value the author claimed for this method. In the *Dental News Letter* of January, 1856, in a communication by Dr. F. Y. Clark on "Material Used in Filling Teeth," he says:

"Now as gold is too costly, and tin is too soft, what are we to do with those poor patients that are continually seeking our aid? The plan that I adopted two or three years ago I find as yet works well. At first I had many misgivings on account of two metals being placed in contact in the same tooth, but I can see no difference in placing two metals in contact in a tooth than in placing them in contact around it. But I think the evil is more imaginary than real, for so far I have not been able to detect the least trouble. Therefore, when I have a patient who is not able to pay me the worth of the gold used (I speak of teeth with large cavities on their grinding surface), I commence with tin, and fill up to the fangs (if I have removed the nerve), also the pulp cavity, and as much of the crown as I safely can. I pack the tin in perfectly hard, leaving or making it flush, and then with annealed number four gold foil I finish off. I use number four because I find it can be forced into the little threads in the walls of the cavity better than any other number, when annealed. Now I cannot see why such a filling is not just as good as if it were all gold. The tin cannot wear nor corrode, for it has not the slightest chance, and the gold on the surface is hard enough to resist all antagonists of the mouth, and as the cost is not more than one-third as much as it would be if it was all gold, we can get pay for the gold if not for our work. I always adopt this plan when I have to fill a tooth on the grinding surface, from which I have taken the nerve, for less than six dollars. In the incisor teeth tin or any other metal but gold should not, of course, be used. All cavities that can be filled with tin can be filled equally well with gold; therefore, we have no inducement to use tin but its cheapness."

It evidently did not occur to Dr. Clark that he might possibly be giving a better service for smaller compensation to his poorer than to his more fortunate patient, who was able to pay for all gold. The method he used was solely for the purpose of economy. The idea that a filling must be in harmony with its environment, and not obstruct but aid nature in her work of repair, formed no part of his method, as the object was to get something cheap. The value of a filling depends upon its ability to save teeth, without regard to the cost of the material used. The only other consideration is that

it shall offend the eye as little as possible. If the theory that tin exercises a benign or healing influence when placed in a carious tooth be sound, the problem is how to eliminate its objectionable feature and extend the boundary of its usefulness. A cavity filled with tin, with an outside or protecting covering of cohesive gold laminated, so as not to incorporate the gold in the tin, is in correspondence with nature, and more fully meets the demand of its surroundings.

Much that has been said in condemnation of tin as a filling material is proved, on examination, to be without good reason. That tin foil, when made from the pure metal, disintegrates or becomes powdery is shown to be false. It is a mistake to charge tin with making the teeth black, when really it makes them of a brighter hue. Remove a tin filling after it has been in the cavity of a tooth for years, and the dentin will present a bright, healthy, dense appearance. Tin never penetrates the tubuli like amalgam.

Method of Using Tin for Filling Teeth.—But it may be urged that all this sheds no light upon the most important part of this subject, i. e., the practical application of how to fill teeth with tin so as to remove the objections and retain its virtues. In filling teeth the first step is the preparation of the cavity, and in the use of tin there are no exceptions to the general principles laid down in the various text-books. Unsupported walls of enamel are to be broken down and the decayed dentin removed. In doing this, however, no more tooth structure need be sacrificed than is necessary to accomplish the result. Being interdigitous, tin spreads laterally, and does not need angles, dovetails, undercuts, or retaining pits to hold it in place. It is not refractory like cohesive gold, which stays only when it is anchored so that it cannot get away, but yields readily to pressure. It remains in place, not from necessity but from choice. The removal of healthy tooth structure for retention is not required. It does not call for "extension for prevention," as tin itself prevents extension. By reason of this saving of tooth structure many fillings may be almost entirely concealed.

Tin is introduced and manipulated in the same manner as has been so often described in making cylinder fillings—by the wedging process. It should be condensed into a solid mass so that it may be cut with a sharp chisel or excavator. This is best accomplished by heating the plugger in an alcohol or gas flame to a degree to

render the tin malleable. This requires about 212 degrees F. The sensation of heat which the patient experiences is not so acute as that which follows the introduction of hot gutta-percha, provided it is done with judgment and care. When the tin is consolidated it should be flush with the enamel walls. So far the work is done with the old-fashioned hand pluggers with large handles. The next step is to bring the flattened surface of a very light and extremely cohesive gold cylinder in contact with the surface of the tin, when a union of the metals takes place at an insensible distance, like the uniting of two drops of water. Continue this process until there is an outside covering of gold, which will finish down to a smooth and polished surfaee. For finishing, all that is required are sandpaper and cuttle-fish disks and strips. It does not need to be burnished, as burnishing tends to impair the union of the metals by drawing the gold away from the margins.

All crystalline bodies under force or pressure assume a definite form. The crystals of gold being spheroidal, the tendency under pressure is always toward the center. The same law which governs in the vital organ should be recognized in the treatment of pulpless teeth. It is a misnomer to call a pulpless tooth a "dead tooth." It is true that the process of tooth building is stopped with the death of the pulp, but as the tubuli extend through the sides of the root, a certain amount of vitality may be maintained under proper treatment. This treatment should be in a way to cause as little change as possible in the conditions under which the tooth was formed.

There can be no question that tin in the root-canal is as bland as it would be if encysted in the muscular tissue. Clinical experience has demonstrated that a root properly filled with tin will remain perfectly odorless, while one filled in the same manner with cotton and cement, or gutta-percha, almost invariably gives off a most offensive odor on being removed. This odor is of the kind called "brassy" and is, no doubt, largely due to a decomposition of the amorphous substance which has been arrested in its metamorphosis. A similar odor is often detected on removing a cohesive gold filling which has been placed in a living tooth with great care.

The question which naturally suggests itself is, will a filling of this kind stand the tests of crushing stress equal to those of cohesive gold or amalgam? Dr. White says, "The best filling is one of about

equal porosity with the dentin." Hardness, or the power to resist force when applied out of the mouth, is not a scientific way of testing the value of a filling when placed in a tooth, as the conditions are in no way similar. As before stated, the object is to obtain a filling that in its physical construction shall as nearly as possible conform to the healthy organ. The teeth are not set in the sockets the same as a post is put in the ground. They are cushioned in the jaw and give way under pressure. Besides, the material of which they are made is the most elastic of any known substance. For this reason billiard balls are always made of ivory.

There have been many teeth filled on the grinding surface with tin that have worn out in the center, and yet have protected the walls of the cavity sufficiently to permit nature to make a secondary deposit almost as dense and hard as the enamel with which it was originally covered. A secondary deposit of dentin under a malleted cohesive gold filling would be rare indeed. How often do we see teeth crumble away while these fillings remain intact. It is more scientific to have the fillings wear and save the teeth than to have the fillings remain and the teeth decay. In one case the filling may be easily replaced; in the other the organ is lost while the work remains. This is not intended to cast any doubt upon the ability of the fillings we suggest to withstand the force of ordinary attrition, when placed in any part of the mouth which has been affected with caries. A practical application of this method in many different positions has convinced your essayist of the correctness of the principle that correspondence and harmony and not "crushing stress" are the true factors in tooth preservation.

The points I have endeavored to enforce are—first, that the enamel of a tooth, being formed from without in, plays no part in tooth development or preservation, except to act as a protecting covering; that the process of tooth building is from within out, and and continues from infancy to old age; that nature attempts to protect herself from the encroachment of disease by a deposit of secondary or adventitious dentin; that if the cause of decay is external the recuperative force is from within; that the operation of filling teeth should be based upon a recognition of these processes of nature, and that the material when placed in contact with the dentin should be in correspondence with the amorphous or structureless substance with which the tubes are filled; that of all the materials

which have been employed tin most nearly meets these conditions; that the objection to tin of color, softness and a tendency to oxidation, are met by proper manipulation and the field of its usefulness extended; that it suggests a theory of practice scientifically correct.

If these conclusions are well founded, it removes from the operation of filling teeth the empirical and the doubtful, and inspires the patient with confidence and hope. Being in harmony with natural law, it lifts a burden from the shoulders of the practitioner, and makes a pleasant duty of an irksome task. Having a scientific basis for its foundation, it elevates the standard of dentistry and lends dignity to a worthy calling. Above all, it mitigates the pain and suffering attendant upon operations in the mouth, from which even the most heroic shrink.

"THAT HORRID TOOTH."

[The following poem was published over seventy years ago, and was committed to memory by Rev. S. P. Heath, Gilford, N. H., then eight years old, whose father paid him two cents for doing so. While in the office of Dr. E. B. Cushing of Laconia, N. H., recently, he repeated the poem, and at Dr. Cushing's suggestion sent it to the DIGEST for publication, as affording a good illustration of the progress made in dentistry since that time.—ED.]

I smoked twelve boxes of cigars;
'Tis nothing but the truth.
I chewed tobacco many pounds
To soothe my aching tooth.

I filled it up with opium,
I ate scarce any food;
I swallowed quarts of ague drops,
But ache the grinder would.

At last I vowed "I'll have it out,"
And to the dentist went;
But when I sat down in his chair
My vow I did repent.

For when his awful instruments
Were ranged before my sight,
I jumped full five feet from the floor,
And yelled with all my might.

"My friend," said he, "I'll draw your tooth
With less degree of pain
Than any dentist in the town;"
So I sat down again.

Then he took hold with his savage hook;
I uttered a loud cry.
"Dear Sir," said he, "I hurt you not."
"Dear Sir," said I, "you lie."

He gave the most infernal wrench;
I wished that I were dead;
For all the torments in the world
Seemed centered in my head.

He pulled, he tugged, then out it came,
That horrid tooth of mine;
The monster nearly broke my jaw,
And charged me six and nine.

ABSORPTION OF TEETH IN AN ADULT.—Mr. Headridge describes (*Jour. Brit. Dent. Assn.*) a case of absorption of an upper left lateral incisor and of an upper right central in a healthy man of about forty-five years of age. In the case of the central incisor the root had undergone almost complete absorption, while in the case of the lateral the alveolus was the seat of the same process. No painful phenomena were experienced, and excepting a slightly plethoric condition of the gums no disagreeable symptom was observed. This case is a curious one in view of the fact that the patient enjoyed exceptionally good health.

GOLD FILLINGS IN PORCELAIN TEETH.—By Otto Arnold, D.D.S., Columbus, O. A novel method for making so-called gold fillings in artificial (porcelain) teeth by the use of china decorators' gold paint. The tooth is prepared by grinding off the enamel at the desired spot to a concave shape to afford thickness of material, and with well defined margins to allow of a proper finish. A thin coating of the gold compound is applied to the prepared surface with a brush, after which the tooth is fired in a gas or electric furnace. When cooled remove and a layer of gold will be visible where the compound was applied. If this layer covers the surface uniformly, gold foil or pellets can be made to cohere to it under similar conditions that obtain in ordinary gold filling operations. The advantage of this process is being able to produce artistic effects without materially weakening the artificial tooth, as in the case when undercuts for retention are made. This process may also be utilized for porcelain inlay work, using amalgam as the retention medium.—*Ohio Jour. Jan. 1902.*

Digests.

MICROBES OF DENTAL CARIES. By J. Choquet, Chief of the Bacteriological Laboratory and Professor in the Dental School of Paris. Read before the International Dental Congress at Paris, August 8, 1900. In writing this paper we have not undertaken the study of all the microorganisms of dental caries, but it has been our aim to specialize that point of which the etiology has as yet not been studied, namely, the recurrence of caries under fillings. When we say fillings we mean those that have been carefully inserted, the cavities thoroughly cleansed and correctly prepared; we also have reference to good filling materials. It is too absolute to affirm, as Dr. Cruet does, that recurrence of decay does not take place if the cavity has been carefully prepared and cleansed and a layer of white and hard dentin left in the bottom. Prominent practitioners who combine their clinical observations with those of the laboratory, more especially the microscope, are diametrically opposed to this opinion. They have proved what they advance. Dr. Galippe says it makes no difference with what amount of care the cavities have been prepared, and it does not matter what antiseptics are used to secure sterilization, there will always be found tubuli invaded by microorganisms. Dr. Miller, in his paper on the comparative rapidity of penetration into decalcified dentin of different antiseptics, says that the practice of superficially bathing cavities of decay with an antiseptic before inserting the filling was followed by many practitioners even before the appearance of the microbe theory; that the practice is universal, and its object is the devitalization of the germs which may have been left in the deeper layers of dentin.

In an article we find the following statements: "There are few practitioners who place so high an estimate upon their own skill and thoroughness as to imagine that they excavate every cavity perfectly." Further on, "It may appear remarkable that, while so much attention has of late years been bestowed upon the antiseptic treatment of root-canals, very little attention has been given to the subject of the antiseptic materials for filling cavities of decay." In an interchange of letters which took place recently between Williams, Wedelstaedt, and Grayston, Grayston says, "The dentin which seems hard under burs and excavators can nevertheless be entirely infected." Dr. Williams, while contending that there are very few chances for the recurrence of decay under a gold filling after ten years, admits, nevertheless, the possibility. We are of the opinion of Galippe and Miller, and we also believe that notwithstanding all the care used in the preparation of a cavity and its subsequent filling we can never affirm that there will not be a recurrence of decay. We do not in this include caries arrested by the

formation of secondary dentin, as we would in that case go out of the limits of the question. How is it possible to explain those cases in which we find perfect fillings of amalgam or cement inserted for five, ten, fifteen, twenty, and even twenty-five years, and that under these fillings we find softened dentin, more or less discolored, which in time will cause complete destruction of the pulp? We take it for granted and set it down as a principle that those fillings were good, and that there was no space or interval in the continuity of the filling and the walls of the cavity. It is necessary to admit in such a case that the cause is an internal one, and that it has developed as the consequence of the presence of certain microorganisms left in the tubuli of a kind of dentin which appeared to the eye and touch healthy.

It is to these species of slow development that we have directed our attention and efforts. Out of three filled teeth in which the fillings had been preserved intact we succeeded in isolating and studying specially five species of microbes, which we will designate under the Roman numerals I, II, III, IV, V. These teeth were extracted for these reasons: 1. A lower left second molar in which the buccal surface had been filled seven years before was extracted to prevent trouble accompanying the difficult eruption of the third molar. 2. An upper left second bicuspid with a filling in the mesial surface was extracted to facilitate the regulation of the cuspid. Filling four years old. 3. Upper right third molar; occlusal cavity; amalgam filling three years old. Tooth extracted on account of pulpitis. We inserted these several fillings, using all necessary care and taking the precaution of moistening the bottom of the cavity by means of cotton saturated with an antiseptic solution. The number of microbes found under these fillings was much less than was found in the superficial and even deeper layers of decayed dentin when in contact with the oral fluids. These five species, without being entirely anaërobic, nevertheless present a marked tendency to grow better in the absence of oxygen. In regard to particular properties, they present marked variations. They develop very slowly in the culture-media generally employed; nevertheless, in the course of time and as a consequence of their development, which for five years has taken place out of their own medium, they seem to have gotten acclimated and grow now with great rapidity. The morphological characteristics have not suffered any change, while the chemical reactions, weak at the beginning, are to-day entirely changed in one way or another. Certain species grow only at the temperature of the incubator (36 to 37 degrees C.) while others grow just as well at ordinary temperature. We have been unable to find a similarity between these species and those heretofore described, except that we suppose Nos. III and IV to be a variety of pneumococcus. These five microbic species can be subdivided into three classes of

micrococci and two classes of bacilli. A description of them will be given later.

Experiments of Inoculation.—The study of the etiology of caries, notwithstanding the difficulty of finding an appropriate medium for the separate culture of the different species, became a very difficult task when the attempt was made to produce artificial caries, not on teeth out of the mouth, but on tissues of living animals—on teeth of physiological animals. We have been unable to find records of this kind of experiments in any of the works treating on the etiology of dental caries. Underwood and Milles, Miller, Goadby, and Williams produced artificially the disorders of caries on tissues which did not possess the physiological integrity necessary for this kind of experiments. These experiments were made in some cases on teeth placed in some special nutritive media approaching as nearly as possible the chemical composition of saliva; in others they were carried on on calcified or decalcified longitudinal sections similar to those used in microscopical examinations—always on dead organs devoid of the physiological integrity which ought to be reckoned with in this kind of experiments.

We tried to do better in order to approach as closely as possible to the phenomena which take place in dental caries. We decided on the sheep as the animal which promised the greatest chances for success, because of the size of the incisors; the labial surface is more or less like that found in the human lower incisors, and because of the relative docility of the animal. The sheep was placed on a table and securely bound, the rubber-dam being applied over one or two incisors to prevent contact with saliva; the superior layers of the tooth were removed with a chisel, and with a wheel bur a cavity three mm. in depth by four mm. in width was prepared. The *débris* was removed with a current of hot air, and the most difficult and delicate part of the operation was begun. A very small drop of bouillon which had been inoculated twenty-four hours before was deposited in the bottom of the cavity. Over this a small, thin platinum cap was placed. This cap had been previously heated to redness, and in its concavity a small particle of gelatin, culture D, had been placed. A cement filling was made over the cap, and in order to avoid contamination with saliva, a drop of wax was melted over the cement so soon as it began to harden.

This experiment was made on the first right lateral incisor of a sheep possessing its full dentition. The microbic species used was that which we designated as No. I. During the nine months which the experiment lasted the animal did not seem to feel any discomfort while masticating. At the end of this time it was slaughtered, and the following phenomena were discovered: The cavity which had been made was found to be nearly oval in form. The dentin, instead of being white, as it normally is, was of a yellowish hue. It was

also softened. The softening, reaching a slight depth, was very plain, and a great deal more noticeable in the widest portion of the cavity, at the point where the diameter of the cavity had increased. A small particle of this softened dentin was carefully taken, and on inoculating the same kind of media as had been originally used we recognized the same species we had used for the original inoculation. The artificially decayed teeth were decalcified, and sections were made which showed that, although the softened zone was very small, the canaliculi had been invaded; the organisms could be found in the tubuli at a depth of two and one-half mm. The appearance of this section was not so typical as sections from teeth normally decayed. At twenty-five diameters the section presented the following appearance: The portion of the cavity which had not been attacked by microbe No. 1 was apparently normal. The coloring reagent, methyl-violet, was easily washed out. The borders were very plain, and seemed to have retained the appearance made with the wheel bur while drilling the cavity. The part of the cavity which had suffered from the action of the microbe seemed, on the contrary, to be entirely disorganized. We found in certain places small cavities like those found in normal decayed human teeth. At one hundred and fifty diameters the basis-substance appeared to have liquefied, and the tubuli appeared separated in transverse section. At eight hundred diameters it was possible to get a plainer view of the destruction of the basis-substance of the dentin, which was entirely corroded at the borders. On careful examination of the tubuli we found scattered here and there microbes of the kind used for the original inoculation. We wish to emphasize the fact that the microbes were found scattered at different points in the course of the tubuli, and not in masses, as in normal dentin. If the animal had not been slaughtered until a year later it seems probable that we should have found the same effects as in man, except that in the sheep we do not find the ramification of the tubuli near the enamel. Thus was demonstrated the possibility of producing artificial caries in a living animal.

We cannot repeat here all the experiments of the different investigators who have worked on the etiology of dental caries, so speak here only of the latest article on the subject by Mr. Kenneth Goadby. We do not agree with Mr. Goadby in the conclusions he draws from his researches. In his paper, entitled "The Microorganisms of Dental Caries," he speaks of the necessity of the unification of culture-media in order to conduct satisfactory researches, and also for the benefit of those who would desire to take up and verify them, who in that case could work on a similar basis. This proposition is a very just and rational one, especially when we know what modifications and transformations can occur in the morphology of a microbe, according to the medium in which it grows. Is it necessary

to recall in order of procedure the experiments made by Raullin when bacteriology was in its infancy—experiments made by means of the liquid which bears his name and in which a slight modification in the composition is sufficient to arrest or to transform the growth of a given species? Or is it necessary to recall the works of Gissard concerning the bacillus pyocyaneus, which he could at will cause to produce pyocyanin or fluorescence, according to the way he cultivated it, either in albumin or at a heat of thirty-seven degrees for five minutes?

Concerning the first experiments of Miller on the microbes of the oral cavity, it may be remarked that although we should consider that at that time bacteriology was in its infancy, nevertheless he occupied himself with the fermentation which these microbes could cause. He worked on their pathogeny by inoculating mice and rats, and as a consequence did not limit himself exclusively to the morphology.

Mr. Goadby thinks, and we agree with him, that in order to name a new microbe it must present such peculiarities in its biological, pathological, and biochemical properties that we should be able through those peculiarities to distinguish it from other species. The biochemical are, in our opinion, those properties which will greatly facilitate this distinction and identification. It is on this point that Mr. Goadby contradicts himself by leaving out the chemical questions; that is, the action of the microbes on carbohydrates and nitrogenous substances. In fact, we cannot admit that the only nitrogenous substances susceptible of being attacked by the bacillus necrodentalis, bacillus furvus, and bacillus plexiformis should be milk and peptone. There are probably other substances susceptible of undergoing fermentative changes which can be very active when under the influence of these organisms. For instance, glycerin, saccharin, lactose, dextrin, mannite, are some of the substances Mr. Goadby has not used in his experiments. We do not know if those microbes dissolve cooked albumin, if they cause fermentation of urea, if they convert nitrates into nitrites.

The author tells us that none of the microbes that he has studied have produced indol in the peptone solution, but this is not extraordinary when the reagent he has used to demonstrate the presence of indol is composed, as the author tells us in his previous article, of sulfuric or nitric acids, ignoring the potassium nitrate, which is not only useful, but absolutely indispensable to obtain the red currant coloration peculiar to indol.

Mr. Goadby criticises the theory upheld in Dr. Williams' remarkable work, as to the decalcification of enamel through the rapid deposition of microorganisms over the surfaces of teeth; but to-day the chemico-parasitic theory is not only admitted, but also recognized as the only explanation. This theory is certainly rational.

It is true that the demonstration was not complete. Dr. Williams admits that he did not cultivate all the species in artificial media, but just the same the theory has all the chances of being recognized and accepted. Then Mr. Goadby finds fault with Dr. Williams for the omission among the organisms of one species which he and Mr. Washbourn have constantly found in three hundred mouths examined. They also found this organism in one hundred and fifty mouths in pure culture. We refer to the streptococcus designated by Mr. Goadby under the name of Streptococcus brevis. The frequency of the streptococci in the oral cavity (where it occurs in many different forms) was first pointed out by Netter in 1889. It may be that Mr. Goadby and Mr. Washbourn found the streptococcus first described by Marot, in which case they could have identified it by carrying the growth on a potato, where this microbe grows very well in contradistinction to the other species which do not grow on this medium; or by inoculating any animal, say the white mouse. If septicemia does not take place there is every reason to think that it is Marot's streptococcus. We do not admit, then, that Mr. Goadby should claim to have been the first to discover the presence in the mouth of the streptococcus, should it be the streptococcus brevis or any other.

In going carefully over Mr. Goadby's work we noticed that sometimes he goes out of the limits of the question (etiology of dental caries) to occupy himself with the microbes found in the saliva and over the teeth. This is, for instance, the case with the leptothrix buccalis. We find that among the anaërobic species Mr. Goadby has obtained and cultivated from the deep layers of carious dentin the mesentericus (ruber, vulgatus, fuscus). We cannot admit that those species are true anaërobic organisms. You may call them anaërobic facultatives if you please, but never purely anaërobic. The author probably found himself in the presence of some species which, while not the mesentericus, had some likeness to it.

Where we agree in every respect with Mr. Goadby, and where we find his superiority, is in his finding that the liquefying properties are so frequently possessed by the aërobic species taken from the surface of decayed dentin. These species liquefy gelatin and serum rapidly, and give a marked coloration to the nutritive media in which they have been cultivated, the phenomena depending entirely on the conditions present. We also think, as Mr. Goadby does, that the species obtained from the deeper layers produce one or more acids, but not so rapidly as he states, as the microbes which we have studied do not begin to acidify the liquid culture-medium before the fifth or sixth month, in any case, we wish to remark that the species Mr. Goadby speaks of are facultatively anaërobic.

Mr. Goadby accepts Miller's demonstrations that the first stage of dental caries consists in the disintegration of the calcium salts,

but we do not see the reason why, after criticising Miller for having worked with impure cultures, he did not carry his experiments of confirmation on the same basis; that is, on undecalcified sections. In fact, having at his disposal pure culture of his bacillus furvus and his bacillus plexiformis, we think it would have been to his advantage to have used sections of dried teeth rather than decalcified sections. We have made comparative experiments with certain common microbes, such as the micrococcus roseus and bacillus megatherium, and we have been able to see clearly that undecalcified sections of teeth placed in tubes of peptonized gelatin were after a certain time completely corroded by contact with those species. As a consequence we think that it would have been preferable for Mr. Goadby to have those microbes act on undecalcified sections in order to see if they had any digestive action either on albumin or on starch paste. We cannot advance anything in regard to the property said to be possessed by some species, of having a liquefactive action on gelatin and no action whatsoever on dentin; but on the contrary, we can affirm that certain species (No. I at least) do not liquefy gelatin but dissolve dentin.

With regard to the bacillus necrodentalis which Mr. Goadby has so often found in pure cultures in the deep layers of dentin, and to which he seems to attribute some prominent part in the process of dentin destruction, it is regrettable that its action should not have been tried on carbohydrates and nitrogenous substances. Mr. Goadby tells us that he did not observe the presence of gases, but he forgets to state in what medium; and we think, judging from the changes that milk undergoes, that it would have been very interesting to see the fermentative action of this microbe on lactose or some other similar body. In concluding, he says and maintains that in dental caries: 1. The liquefying organisms are in the majority of cases aërobic. 2. The majority of microorganisms found in the deep layers of dentin are producers of acids. 3. It does not follow that because gelatin is liquefied dentin will be digested (dissolved.)

Nutritive Media.—The nutritive media that we have used in our experiments are: 1. Peptonized bouillon, peptonized gelatin, peptonized gelose, 1 per cent. 2. Bouillon glycerophosphate of calcium, gelatin glycerophosphate of calcium, gelose glycerophosphate of calcium, at 1 per cent. 3. Special bouillon, special gelatin, special gelose. 4. Tooth gelatin. 5. Potato. 6. Milk. 7. Starch. 8. Carbohydrates. 9. Nitrogenous substances. Being absolutely convinced of the necessity of unification in culture-media, and to avoid criticisms such as we have just made upon Mr. Goadby, we give not only the composition of the nutritive materials we have used, but also and especially their preparation. Our bouillon is always prepared by macerating for four hours 500 grams of beef in one liter of distilled water at ordinary temperature. It is then

filtered through a wet filter paper and boiled for five minutes. One per cent of peptone is added. The liquid is then neutralized and put in the autoclave and left there for ten minutes at 115° C., filtered and put in test tubes. Salt is never added to the bouillon of whatever formula. This is the formula of ordinary bouillon, or bouillon A. The bouillon glycerophosphate of calcium has the same composition as the preceding, with the addition of one per cent of glycerophosphate of calcium. The formula is then: Bouillion, 500 grams; peptone, 5 grams; glycerophosphate, 5 grams. Special bouillon has the following formula, which approaches as much as possible the chemical composition of the human tooth: Bouillon, 500 grams; peptone, 5 grams; phosphate of calcium, 50 grams; carbonate of calcium, 10 grams; phosphate of magnesia, 5 grams. After mixing all these substances, the liquid is sterilized, filtered to such a degree that the liquid should have a lemon yellow color, and should not present any trace of the substances used. The nutritive media, like gelose and gelatin, are incorporated with the bouillon in the proportion of twelve per cent and seven per cent.

There is another solid special nutritive medium which approaches as much as possible the chemical composition of dentin, and which is prepared in the following way: To 125 grams of simple bouillon, without peptone and neutralized, are added 31 grams of a very fine powder obtained by filing a hippopotamus tooth. The liquid is sterilized in the autoclave at 115° or 120° C. for fifteen minutes, and without being filtered is put into test tubes, which are then sterilized at the same temperature. For inoculation in striæ the tubes are placed in an inclined position. In other cases they are to have an upright position. After cooling, a good transparent gelatin is obtained. It dissolves at about 19° or 20° C., and presents at the bottom a white layer, which is the result of the settling of the dentin. The other media used are—nitrogenous substances; peptone, cooked albumin, milk, urea, nitrates, starch. Carbohydrates: glycerin, mannite, dulcite, glucose, saccharose, maltose, arabinose, lactose, dextrin, inulin. For the composition of these substances the reader is referred to the extensive work of M. Grimbert on the unification of culture-media in bacteriology. We will add that when working on urea we put a little chalk in the bottom of the tubes. We insist upon the use of those special media which we have obtained after many experiments, and whose formulæ have already been given. These media have given us the best results in regard to the development of the species studied. The media that we particularly prefer are the gelatin, D, B, and G.

Concerning the Non-specificity of the Microbes of Dental Caries.—It would have been possible for us at one time to have supported the theory of the specificity of certain microbes in the production of dental caries, but as we proceeded in the study of this

question and in cultivating the different species obtained from the superficial and deeper layers of dentin, we became more and more convinced not only that there was no specific microbe, but that its existence was an impossibility. In fact, according to the chemico-parasitic theory, this affection presents two absolutely defined and distinct stages: (1) Decalcification of the hard external portions of the tooth, as a consequence of the secretions of certain microorganisms yet to be determined, although Williams has done a great deal toward the illumination of this question; (2) penetration of the living tissues by these organisms, producers of acids, or by some other kind, and their subsequent growth in those tissues—a growth which must go on with ease, judging from the histological structure of the tooth; that is, the dentin, dentinal tubuli, dentinal fibers, and interglobular spaces, or spaces of Czermarck.

According to the definition given by Dr. Frey, caries is an affection which proceeds from without inward. In our opinion, once decalcification has taken place the remainder of the work is performed by other organisms from those first concerned; these give up their places to an immensity of other species of relatively very small volume, which can penetrate with ease into the basis-substance or dentin which has been slightly decalcified, or into the dentinal tubuli, which, as we know, are smaller and greatly ramified in the vicinity of the enamel. To make it appear, as we see in many works on dental pathology, that the leptothrix threads penetrate the dentinal canaliculi is absolutely irrational, and such a statement could be made only by one who had never made any microscopical study, or at least had not compared the caliber of a dentinal tubule near the enamel with the diameter of any leptothrix.

Dental caries, when the disease is localized in the dentin, is of polymicrobic origin. There is no specific microbe; the existence of one could not be possible. All the species obtained from the superficial and deep layers of softened dentin, and even from the dentinal tubuli, away from the softened zone—all these species are, we will not say common (the inoculation of certain microbes which we have found having proved their pathogeny), but they all originate from the oral cavity.

We are among the first to recognize that it is impossible to isolate a microbe by microscopical examination alone; nevertheless, without expecting to identify them, we can with the microscope make the distinction between a micrococcus and a bacillus or a thread. So, if we examine a section of decayed dentin, even with low powers, we shall never find just one species of micrococcus or bacillus, but always microbic associations. Sometimes the cocci will be in greater numbers, sometimes the bacilli, according to the portion of dentin examined, whether from nearer the surface or from deep in the structure of the tubuli. Some species may preponderate, and we

must consider the microbic antagonism which must exist in the tooth, just as on the body, which makes the preponderance of either the cocci or the bacilli.

It may be justly remarked that the penetration of the microbes into the tubuli proves their anaërobic properties. To this we reply that a great majority of the microbic species found in the mouth are not true aërobic, but facultative aërobic. In fact, the number of pure anaërobic species is absolutely small, so that we cannot admit the specificity of a certain microbe. If certain species are found more frequently than others in carious dentin, and especially in the depths of the tubuli, it must be due primarily to microbic antagonism existing between the great number of species which have gained entrance into the canaliculi, and also especially to the surroundings of a new field of culture. The true aërobic species and the facultative anaërobic which were mixed up at the opening of the tooth became gradually accustomed in the canaliculi to their new habitat. The anaërobic facultative species had their anaërobic properties developed, and the aërobic had either to stop in their destructive course toward the pulp or had to get gradually accustomed to the absence of oxygen. This explains the great decrease of microbes in the deeper portions of the tubuli, where we find only a few species, as has been proved by the experiments of Galippe and Vignal, Miller, Goadby, and our own.

We are convinced that these microorganisms have no specificity such as we find in anthrax, cholera, tetanus, or the plague. They originate in the saliva, and in the course of time it will be possible to identify them by means of cultures and growths in laboratories.

Study of Five Microbic Species Found Under Fillings.—The species which we have specially studied among those we obtained from the deeper layers of dentin in contact with good fillings, and which were derived from the three cases referred to in the preceding pages, are the following: *Species No. I.*—Bacillus, facultative, aërobic, with marked tendencies to grow better in vacuum than in the air. The temperature of the incubator seems to favor rapid development in bouillon. The favorable culture-media are very few, as this species does not grow in gelose of any composition or on potato. This bacillus presents, as we will see, extraordinary peculiarities. Thus, if the growth is carried on in bouillon inoculated with a very small particle of culture taken from gelatin, the development is very rapid; but if we inoculate a culture from a growth in bouillon the development is slow and sometimes never takes place. In the same way, in order to inoculate tubes of gelatin we must use particles from growth in bouillon, otherwise no result is obtained. This species possess the very extraordinary property of changing their form. Thus if inoculated in gelatin they present the bacillus form; if inoculated in bouillon they are entirely

transformed. Under the microscope we see them changed into ramifying bodies with rounded and swollen extremities. If a drop of bouillon is transferred to the gelatin the primitive form reappears.

Bouillons.—Of the three classes of bouillon that we have used, the growth went on with greatest rapidity in bouillon C. In general the growth requires four hours in tubes stopped with cotton, and two hours and a half in vacuum tubes. The growth has the form of a small, well-defined cloud of a silky appearance, localized in the upper portion of the tube. After ten days this cloud diminishes in an imperceptible way, the bouillon clarifies, and there is found at the bottom of the tube a finely granular deposit. Bouillon B comes next in rapidity of growth. This bouillon becomes clouded at about the fifth hour, just as well in the air as in the vacuum. A few bubbles of gas are produced, and this kind of fermentation lasts about forty-eight hours. About the tenth day the upper third of the liquid becomes cleared off, while the remainder continues to be cloudy. Bouillon A takes still longer for the cloudiness to appear—from seven to eight hours. These different kinds of bouillon, all of feeble alkaline reaction before inoculation, become acid at the sixth month. If the examination is made with a hanging drop preparation, a marked rotary movement is observed. About the fifth or sixth day all movements disappear.

Gelatin.—Rapidity of growth, B, D, C, A. This species when inoculated in Pétri dishes, prepared in the ordinary way, that is, by inoculating a tube of liquefied gelatin with a particle of culture in bouillon, begins to grow at about the fifth or sixth day. The colonies are of oval form and yellowish color, and become round and white, with a metallic luster as they come nearer to the surface of the gelatin. It should be remarked that this species required at the commencement of the experiments two months in order to obtain the same result. These colonies are not *liquefacients.* They possess the peculiar property of producing at about the twentieth day a cloudiness all through the gelatin, and to retard and even to prevent any fungus growth, which could be produced by the deposition of fungi on the surface of the gelatin.

Stab Culture.—The line of inoculation is granulated. The whole presents the appearance of a nail with a well defined head, especially in gelatin culture (C). In this medium there is formed at the superior portion a distinct cloudy and dense circle. The color of the colony becomes in the course of time (one year) grayish, and presents a metallic luster on gelatin D. The head of the nail is less defined, and the color, which was grayish, becomes transparent pearl-white. There is no cloudiness through the thickness of the medium. In gelatin B the head of the nail is less defined than in D, but as compensation there is a very thick cloudiness. In cultures one or two years old on this medium the cloudiness becomes brown-

ish at the center, corresponding with the point of inoculation, and it is sometimes very hard to go through it with the platinum wire. On gelatin A no nail is formed. The growth takes place in the bottom, and without the formation of any cloudiness.

Smear Culture by Means of a Pipet.—Gelatin A colonies develop very slowly. It takes them two months to make their appearance. They are thick, adhere to the gelatin, and are of a porcelain white. Cloudiness appears about the second month after the first appearance of the culture. Gelatin B—Growth very rapid; begin to develop after forty-eight hours. Colonies look creamy, but in reality are dry, and are easily separated from the surface of the gelatin, to which they scarcely adhere. Gelatin C—Same phenomena. Gelatin D—Appearance is greasy and thick. At the beginning is nearly invisible, becoming yellowish in the course of time.

Although glycerin is not considered among the group of nutritive materials used in bacteriology, we have made a trial on gelatin pepto-glycerized at one per cent. It was a long time before the colonies appeared—eight months. At the beginning the color was the same as in gelatin D, but after three years the point of inoculation became entirely black. The odor of this tube, especially after a time, is something like that of carious dentin. In this case the culture developed in a splendid way, and had a thick and creamy appearance.

Serum—no growth. Gelose—no growth, inoculation from the deep portion of a culture on gelatin did not give any result. The same with inoculation from bouillon. Potato—no growth. *Action on Nitrogenous Substances.*—Peptone—grows without the production of indol. Albumin—grows, but does not dissolve it. Milk—grows without changing it. Urea—grows without marked fermentation. Nitrates—no growth. *Action on Carbohydrates.*—Glycerin—grows, slight fermentation. Mannite—grows, slight fermentation. Dulcite—no fermentation. Erythrite, Arabinose—no fermentation. Glucose, Galactose—slight fermentation. Saccharose, —very active fermentation. Lactose, Maltose, Dextrin—slight fermentation. Inulin—marked fermentation after forty-eight hours. The liquid, when heated with Fehling's solution, gives after cooling a brownish-green color, while another tube under the same conditions gives an orange color. Starch paste—no growth. Pathogenesis—none.

Species No. II.—Micrococcus, very small, facultative aërobic, growing better in the absence than in the presence of air. Grows very slowly on gelatin, and if the Pétri dishes are used the colonies do not appear before the fifteenth or twentieth day. The gelatin is not liquefied, but becomes soft, especially in stab cultures. Particular characteristics, alkaline reaction of the bouillon after six months, and formation in the gelatin after a year of big crystals

that we have as yet not determined. These crystals sink to the bottom of the tube after going through all the thickness of the gelatin. Grows better at incubator temperature than at ordinary temperature. Gelose is a bad medium for the development of this species. This species stains well with the ordinary staining reagents. Bouillons A, B, C—Rapidity of growth B, C, A. Bouillon B—The cloudiness appears after four hours; it has a silky appearance. The liquid becomes clear after ten or twelve days, and a finely granular deposit appears in the bottom of the tubes. Bouillon C—Same phenomena, except that it takes longer for the liquid to clear. Bouillon A—Same phenomena. Trials were made on bouillon pepto-glycerized, and after inoculation a small fermentation took place. Examination with the hanging-drop preparation reveals a marked rotary movement for six to seven hours.

Gelatin.—Rapidity of growth B, C, D, A. This species grows very slowly in this medium. At the beginning the time required for this species to develop in this medium was one month; to-day it is three. The gelatin is not liquefied, but becomes semi-soft. The color of the colonies in the Pétri dish is first white, but as the colonies appear and develop near the surface they become greenish-white, round, with a depressed center.

Stab Culture.—Course of inoculation is granulated. The upper portion of the gelatin at the point of inoculation looks something like a nail. This corresponds to what later will become the dark portion of the colony. The colony grows larger and sinks to the bottom of the tube in a V-shape form. The borders are greenish-white, and slightly indented. The central portion is dark. All around the colony and at the superior portion of the gelatin a cloud is formed something similar to the one observed in No. 1. The crystals above referred to do not appear before a year. These phenomena are the same for the different kinds of gelatin, except that the clouds and crystals are only found in the peptonized gelatins.

Smear Culture.—Growth very slow. The inoculation should be made by means of a platinum wire or a pipet. The appearance of the colonies is the same except for gelatin D, where they all look transparent.

Serum—Slight greenish-white appearance, culture very small. Gelose—Growth very slow in occurring. I, on Gelose B. After fifteen days the colony appears like an accumulation of small spinning points. II, on Gelose C. As a general rule after twenty days. No result on ordinary gelose. Potato—Small whitish appearance after fifteen days. These delays in development are a little lessened when the cultures are carried on in the absence of air. *Action on Nitrogenous Substances.*—Peptone—grows, no formation of indol. Albumin—grows without dissolving it. Milk—no change is produced. Urea—grows, slight fermentation during four hours.

Nitrates—no growth. *Action on Carbohydrates.*—Glycerin—slight fermentation. Mannite—no fermentation. Dulcite—marked fermentation. Erythrite—same phenomena produced. Arabinose—imperceptible fermentation. Glucose, Galactose—no fermentation. Saccharose—no fermentation. Maltose—marked fermentation. Lactose, Dextrin, Inulin—no change. Starch paste—grows without dissolving it. Pathogenesis—produces when inoculated in small quantities in the white mouse and in the guinea pig abscesses of great size. General infection does not take place.

We wish to emphasize that this species, as well as No. III and IV, although it may seem extraordinary, cause a fermentation in urea. We must also say that fermentation takes place only in those tubes in which a small quantity of carbonate of calcium has been previously placed.

Species No. III.—Diplococcus, anaërobic facultative; grows better in the absence than in the presence of oxygen, and with greater rapidity at incubator temperature than at ordinary temperature. Stains well with Gram's method and with Ziehl's carbolized fuchsin. With this preparation it is sometimes possible to detect a capsule which appears more plainly when examination is carried on in a hanging-drop preparation.

Bouillons.—This species develops just as rapidly in any of the three kinds of bouillons that we have used (A, B, C). Cloudiness appears after four hours, just the same if the inoculation is made from a liquid medium or from gelatin. In the vacuum the cloudiness begins more rapidly, and is complete after two hours. Bouillon A—Silky cloudiness in all the liquid. This begins to clarify at about the fifteenth day, and a gray filamentous precipitate is deposited in the bottom of the tube. Bouillon B—Same cloudiness; fermentation lasts five to six hours. The upper part of the tube becomes perfectly clear at about the second month. No muco-filamentous precipitate is observed. Bouillon C—A uniform cloudiness is present. A muco-filamentous and thick deposit is observed in the bottom of the tube. These three bouillons become of an acid reaction at about the third month. If the species is examined with the hanging drop a very plain capsule is observed, and also a vibratory movement, which disappears after five or six hours.

Gelatin.—As we proceed in the culture of this species the development takes place with less rapidity, and the biological and pathogenic properties seem to have undergone marked modifications. Originally the culture of colonies carried on in Pétri dishes of gelatin developed in forty-eight hours. To-day it takes eight days before they begin to appear. They have the appearance of white points, which become of a porcelain white as they approach the surface. They are uniformly round, and of button shape.

Stab Culture.—Fine granular appearance all along the course of

inoculation. This begins to become visible at about the tenth day. Growth is as rapid in the presence as in the absence of oxygen. There is a difference in the appearance of the culture, according to the presence or absence of oxygen. In the air colonies are of a porcelain white; do not have the nail form, but spread over the surface of the gelatin. Appearance after two months of a cloud just beneath the point of inoculation. In the vacuum colonies are colorless, but of the same form, and have no cloud. Gelatin B—(1) In the air the borders of the colonies are folded; they are of a grayish white; the central portion of a yellowish white. Cloudiness all over the gelatin. (2) In the vacuum central portion is yellowish; peripheral portion is transparent; presence of a cloud. Gelatin C—(1) In the air same appearance as A, with the difference that the cloud is very slight and appears a little later, at about the fourth month. (2) In the vacuum uniform white porcelain spot, with borders cut out like clubs.

Smear Culture.—A colonies are of a creamy-white appearance; develop in the air at about the fifteenth day, and in the vacuum from the eighth to the ninth day. No cloudiness appears in the gelatin in the air or vacuum. B colonies are greenish-white lengthwise; thick clouds appear in the presence or absence of oxygen. C, same phenomena as with stab culture. D, thick, creamy, transparent spot; cloud in the upper portion. Serum—Delicate spot. Brilliant white color appears after six hours in incubator. Potato—No appearance of growth. Gelose A, B, C—Rapid growth; very plain after three hours. Colonies white and rounded.

Action on Nitrogenous Substances.—Peptone, Albumin and Milk—no action. Urea—very active fermentation. Nitrates—grow, but without transforming them into nitrites. *Action on Carbohydrates.*—Glycerin—growth, slight fermentation. Mannite, Dulcite—very slight fermentation. Erythrite, Arabinose—active fermentation. Glucose, Galactose—very slight fermentation. Saccharose—very active fermentation. Lactose, Maltose—fermentation. Dextrin, Inulin—slight fermentation. Starch paste—no action. Pathogenesis—Originally an inoculation in the leg of a white mouse of half a cubic centimeter proved fatal. At the autopsy this species was found in pure culture in the blood in the form of capsulated diplococci. This primitive virulence has become very attenuated, as the inoculation of the same species produces to-day only a bad but transient indisposition.

Species No. IV.—Cocci grouped in pairs, chaplets, or grapes. Aërobic facultative, with tendency to grow better at the temperature of the incubator (36° to 37°). In media kept in the air and at ordinary temperature the colonies grow with difficulty. They have a capsule which is difficult to observe under the microscope. They stain with all the reagents commonly used, the Gram method

included. Peculiar phenomenon. Liquefaction begins now, after five years of culture, at about the fourth month, and progresses rapidly, while originally it did not begin before the eighth month. There is no cloudiness produced in the gelatin.

Bouillons.—Bouillons A, B, C inoculated with liquid culture, or with a particle of a colony from gelatin, become generally clouded after two hours. At the upper part of the liquid a dusty cloud is observed. Bouillon B ferments actively, and presents after ten days, if the growth has taken place in the vacuum, a thick and marked creamy cloudiness. It should be noticed that growth goes on with greater rapidity in the absence of air. When the growth is carried on in the presence of air a pellicle is formed on the surface of the liquid. After eight days the cloudiness has extended over the entire contents of the tube. In time it becomes clear, and presents a white filamentous precipitate, less marked than in No. III. When this species is examined in a hanging-drop preparation we observe a marked oscillating movement. The cocci may be grouped in pairs, grapes, or chaplets; they are very frequently found in the chaplet arrangement. The reaction of the liquid becomes acid at the fifth month.

Gelatin—Stab Culture.—Growth did not appear before the third month; had the form of a delicate and white semi-granular spot. The appearance is something like that of No. III, although less white. The liquefaction begins at about the fourth month. The gelatin while liquefying does not have the form of a funnel, as it generally does with other species. The gelatin shows no cloudiness, and is kept clear even after total liquefaction. In striæ the colonies take the same time to appear. They come in the form of small round and white colonies, which cause the gelatin to bulge out before liquefaction takes place.

Gelose—This is the best solid medium for the culture of this species. On gelose A the growth begins after four days, while on gelose B, and especially on gelose C, a trace of growth is apparent after two hours. This trace is of a whitish blue, and the colonies are round. Serum—a small white spot after six hours. Potato—nothing.

Action on Nitrogenous Substances.—Peptone—grow without the production of indol. Albumin—grow without dissolving it. Milk—grow well; milk transformed into a yellow liquid of disagreeable odor. Urea—grow very well and cause active fermentation. This property so well developed at the beginning tends now to disappear. Nitrates—grow and transform them into nitrites by means of Griess' reagent. *Action on Carbohydrates.*—Glycerin—slight fermentation. Mannite—active fermentation. Erythrite—marked fermentation. Arabinose, Glucose—grow without fermentation. Galactose, Maltose—imperceptible fermentation. Saccharose, Lactose

—no growth. Dextrin, Inulin—slight fermentation. Starch paste —no growth. Pathogenesis—kills mice in twenty-four hours, and is found in pure culture in the heart and lungs.

Species No. V—Bacillus, with a marked tendency to grow better in the absence of oxygen. Just as species Nos. III and IV, this species prefers the temperature of the incubator to the ordinary temperature. It stains well with the ordinary staining reagents; also with the Gram method.

Bouillon A—A uniform cloudiness sets in after twelve hours; a sticky deposit is formed after two or three months. Bouillon B becomes clouded in the same time; presents a cloud in the upper, fermenting part of the liquid, and never clears. Bouillon C—Same phenomena as with A, with the difference that the deposit is a great deal more sticky and compact. When a hanging drop preparation is examined the bacilli are seen grouped in pairs or chaplets; slight rotary movement.

Gelatin.—If the growth is carried on in Pétri dishes the colonies have an oval form and a yellowish color, and begin to appear after forty-eight hours in all new cultures. The appearance of these colonies is now greatly delayed. It takes fifteen days before they begin to appear. These colonies are not liquefacients. At full growth these colonies have a round form, with white, irregular borders, while the central portion, which is the most elevated, is dark yellow. No cloudiness is present.

Stab Culture.—Rapidity of growth B, D, C, A. The course of the inoculation is uniform, and has the appearance of a nail without a head. No cloudiness takes place. The colonies begin to appear at about the fifteenth day. They present the same peculiarities as when growth is carried in on Pétri dishes.

Gelose—Rapidity of culture C, B, A. On gelose C after six hours it is possible to distinguish a growth which reflects rays of brilliant rainbow colors. After twenty-four hours the growth becomes thick and granular, and the refraction disappears. On gelose B the phenomena are the same, except that the colonies are thicker and larger. On gelose A—no growth is produced. On serum—a slight growth of fish-scale appearance (after forty-eight hours.) Potato—no growth.

Action on Carbohydrates.—Glycerin, Erythrite, Arabinose—no growth. Mannite, Glucose, Inulin—imperceptible fermentation. Maltose—no growth. *Action on Nitrogenous Substances.*—No fermentative action; growth takes place nevertheless on these media, except on starch paste.

Conclusions.—We can see from the characteristic properties that we have noted that the species that we have studied have never before been described. To consider them specific microbes would be contrary to our ideas. We only wished to describe them, reserv-

ing the right to study them again until we should be able to identify them with some other species that are found in the oral cavity, and as conclusion we will say that: 1. There is not, properly speaking, a specific microbe of dental caries. The species that are found in the deeper layers of the dentin are merely ordinary species, more or less pathogenic it is true, but all have their origin in the oral cavity. 2. These species are less frequent in the deeper portions of the tubuli, because of a microbic antagonism or of their facultative anaërobic property. 3. The destructive process of caries may take place under good fillings of whatever material after the lapse of a long time. 4. The experimental reproduction of caries on a living animal is to-day a demonstrated fact. It was produced with a microbic species taken from under a good filling seven years old. 5. It is possible that there are certain microorganisms which will dissolve healthy dentin without themselves being liquefying agents of gelatin and serum.—*Cosmos.*

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MATRIX FOR PORCELAIN INLAY WORK. By Dr. H. J. Bosart, Springfield, O. The foundation of perfection in inlay work is obtaining a perfectly fitting matrix of the cavity and retaining its exact shape until the process of investing and baking is finished. Every worker also recognizes the need of a more certain method for obtaining a perfect matrix than at present exists, so I will present the following, which has been a success in my hands.

If an approximal cavity, the teeth should be separated to give plenty of space for the manipulation of matrix as well as for insertion of finished inlay. Better results are possible throughout the work if the dam is used; but the color of tooth should be selected before placing the dam. First prepare the cavity for the making of matrix by trimming the edges to the necessary extent, leaving them perfectly square, sharp and smooth, avoiding undercuts where they would prevent easy access, which can often be done by leaving some of the more solid decay; if this is not practicable, fill under the overhanging enamel with cement. When hard, shape cavity, giving it parallel sides, thus making the removal of a perfect matrix easy, whereas it would be impossible if undercuts existed.

After matrix is completed remove the remaining decay, and undercut cavity to retain finished inlay. No. 30 gold foil or a combination foil of platinum and gold makes the best matrix, as it is softer than platinum, being more easily moulded to the irregularities of the cavity; this method for removing from cavity and hand-

ling stiffens the matrix and renders impossible a change of shape, no matter how large or complicated the cavity.

Select piece of foil of sufficient size. With a pellet of cotton work well over bottom of cavity; hold and work from there out to edges until foil is perfectly fitted to cavity; then bring foil out over tooth and hold with fingers or stick to tooth with Canada balsam dissolved in chloroform. As the case would indicate, place in the cavity of the matrix—to facilitate removal and handling—either the point of a broach with a slight bend forming a hook, or a bit of floss silk with a knot at the end.

Now fill the matrix with Hill's temporary stopping, using as much care as in putting in a gutta-percha filling. The more care used in placing filling the more perfectly the matrix will be conformed to the shape of cavity. This filling hardening makes an unyielding support to the matrix, precluding the possibility of a change in shape during the process of removal from cavity and investing of matrix. By the aid of the previously inserted broach or floss silk filling and matrix are easily removed and invested.

Mix the investment plaster with water to the desired consistency and place in the baking tray sufficient to imbed the matrix, slightly tapping the tray to settle the matrix in investment, allowing it to cover the free edges but not quite reach the cavity line. To insure expulsion of air bubbles carefully coat the reverse side of matrix with the mixed investment plaster before imbedding. When investment is hard warm sufficiently to soften the temporary stopping, which can then nearly all be removed by the broach or floss silk. What remains wash from matrix with chloroform, which will not soften nor affect investment. Fill cleansed matrix with the selected enamel and bake in the usual manner, with the assurance that the finished inlay will be a perfect fit.—*Summary, Jan., 1902.*

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BACTERIA; THEIR THERMAL DEATH-POINTS. Different species of bacteria vary greatly in their powers of resisting the action of heat. Speaking generally, pathogenic microorganisms perish at a much lower temperature than nonpathogenic bacteria. Thus the well known B. *prodigiosus*, which forms a beautiful blood-red colony when grown on moist bread, cannot withstand a temperature of 58° C. for more than ten minutes, whereas the tetanus bacillus perishes only after six hours at 80° C. The bacillus

of tuberculosis is rapidly destroyed in cultivations at 70° to 80° C.; but according to Welch, it can resist in the dry state a temperature of 100° C. for three hours. In milk it has been found to perish after four hours at 55° C.; one hour, 60° C.; five minutes, at 80° C.; and one minute at 95° C. (Forster). The spores of bacteria can withstand far higher temperatures than the bacteria themselves. Thus the spores of the tetanus and anthrax bacilli are both extremely resistant to heat, though the latter are destroyed by moist heat at 90° to 95° C. This fact is recognized in the sterilization of food products, which are first heated to a sufficient temperature to destroy the parent bacteria, then left for the spores to develop, and again heated to kill the newly-formed bacteria. As regards the action of heat upon the toxic products of different bacteria, it has been found that some, like the toxin of tetanus, are decomposed and rendered harmless after a short exposure to a low temperature; while others, like the toxin of anthrax, are only weakened and not destroyed at temperature of boiling water.—*Am. Microscopic Jour.*

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PYORRHEA ALVEOLARIS WITH SPECIAL REFERENCE TO PRACTICAL MEDICINE. By Wm. Baldwin Keyes, D.D.S., London, Eng. I need make no apology for taking this well-worn subject as the text for my paper, since the medical profession as a body is just commencing to realize its immense importance in the production of various morbid conditions.

Among dentists much has been written upon the etiology, pathology, and treatment of this very common affection, but mostly from a prosthetic point of view; and its cure has been considered advisable more with a view of preserving the patient's teeth and adding to his personal comfort than with the idea of curing or preserving him from some very serious maladies. On looking through a series of volumes of any of the leading dental journals one is struck by the amount which has been written upon the subject, and by the speculations as to its probable cause. Of late years the tendency has been to assume a rheumatic or gouty basis for its production, and several very able men have carried out elaborate investigations, with more or less success, with the hope of obtaining material proof of this hypothesis. The deposits upon teeth have been analyzed, and one observer has claimed to have found that they contained uric acid, only to be contradicted by other equally capable workers.

But the tendency of most modern thought is to show that we may have been putting the cart before the horse, and that instead of gout and rheumatism being the cause of pyorrhea, they are often the effect; and that the general systemic affection is the direct result of the chronic poisoning of the tissues of the patient by the toxins of pus produced by the disease in the mouth.

A most valuable work upon the subject has been recently published by Dr. William Hunter, ("Oral Sepsis as a Cause of Septic Gastritis, Toxic Neuritis, and Other Septic Conditions,") and I have drawn upon it for some of the statements in this paper.

Dr. Herschell, one of the leading specialists in London upon disease of the digestive organs, has for some years also been conducting a very elaborate investigation of the relation of pyorrhea alveolaris to affections of the stomach and heart. In the first edition of his book on "Indigestion," published in 1894, he drew attention to pyorrhea as a cause of certain gastric troubles, and since that time has examined some hundred cases of functional disturbances of the heart and stomach with especial reference to the condition of the gums and teeth.

As regards the production and appearance of pyorrhea, it is for my present purposes unnecessary to go into a detailed description, as these are generally well understood. I will therefore merely state a few propositions which I think are incapable of refutation. 1. The pus from diseased bone is the worst and most virulent kind of pus, as used to be well illustrated by the fearful cases of pyemia met with in operations upon necrosed bones before the advent of aseptic surgery. 2. Therefore the pus from and in connection with diseased teeth may be expected to possess the same characteristics. Teeth are not true bones, but their roots have a distinctly bony covering which, with the alveolar walls surrounding them, will, when in a state of decay and slow decomposition, produce septic conditions such as are found in wounds in any part of the body where pieces of bone are decayed or necrosed. 3. The gastric juice is capable of destroying a certain proportion of the disease germs introduced into it, but not all. 4. During a large proportion of the twenty-four hours a healthy stomach contains no gastric juice. 5. The resistance of the human body to toxins introduced from without varies in different individuals, and *ceteris paribus* will be diminished by poor general health, defective hygiene, or exhaustion

of mind or body. We can thus easily understand how disease germs introduced into the stomach will sometimes set up toxic symptoms and sometimes be tolerated by the individual.

According to Hunter (*op. cit.*. p. 5), the most important organisms met with in the septic mouth are the bacillus gangrenæ pulpæ, the staphylococcus pyogenes aureus, streptococcus pyogenes, staphylococcus pyogenes albus, bacillus pyocyaneus, and the staphylococcus pyogenes citreus. The numerous organisms enumerated by Miller, Fitzgerald, and others appear to possess little practical significance.

The injurious effects of the constant swallowing of pus may be enumerated as follows: A. The effect upon the food in the stomach, producing abnormal fermentation, and the local effects upon the walls of the stomach. B. The systemic effects produced by the absorption of toxins in the system. (A) *Local Effects upon the Stomach.* The following are six typical cases selected from Dr. Herschell's clinic and communicated by him for insertion in this paper: *Case 1. Gastric neurasthenia, hyperesthesia of gastric nerves, hyperchlorhydria.* Louisa F., aged thirty, seamstress, attended the hospital on June 3, 1896. Her present illness commenced twelve months previously, and her chief complaints were of epigastric pain a few minutes after taking food, with a great aggravation about two hours later. This later pain was very severe, and often caused her to roll upon the floor in agony. She described it as cramps. It was relieved by taking food, especially milk. She was also troubled with constipation and palpitation of the heart. Upon making a physical examination of the stomach, splash (*clapotage*) could be obtained two inches below the level of the umbilicus. As the pain happened to be present at the time of examination, a dose of eight grams of sodium bicarbonate was given, with the result of immediately relieving it. On the examination of the stomach contents three hours after a test meal, consisting of meat, bread, and water, the total acidity was found to be 100, free HCl 86, with marked presence of erythrodextrin. There could therefore be no doubt of the presence of hyperchlorhydria, the pain immediately after taking food being probably due to gastric hyperesthesia. On examination the mouth was found to be in a bad condition; pyorrhea was seen to exist, the discharge of pus being very profuse. Treatment was conducted upon ordinary lines until July 2

without any marked benefit, when she was sent to the dental hospital to have the mouth treated. When this had been done, treatment of the gastric neurasthenia was resumed with the happiest results, the patient being practically well at the end of August, with a total acidity of 40 and only the normal amount of free HCl.

Case 2. Myasthenia, or muscular atony of the stomach. The patient, Annie H., a nurse, aged forty-one, presented herself on September 20, 1889. She complained of weakness and palpitation of the heart, vertigo on movement, and had been steadily getting thinner for some time. During the digestive period she was troubled with considerable flatulence. Upon examination the stomach was found to extend two inches below the umbilicus, and contained food residues from the day before. By the water test it was demonstrated that this retention was due to myasthenia, and not to pyloric obstruction. A Turck's capsule demonstrated the absence of any free acid in the stomach. The mouth was filled with black and decaying stumps, and was in a fearfully septic condition. The mouth was treated, and the patient given a simple mixture containing iron and strychnin. By November 28 she was practically well. The gastric splashing was, of course, still to be obtained, although not through the whole of the digestive period, but the patient had a good appetite and was putting on flesh.

Case 3. Gastric myasthenia of the third degree, with retention of food residue. Catherine C., aged thirty, married, came under observation on November 3, 1899. She had been weakly for some years, and had suffered from frequent attacks of syncope. Had a severe confinement six years ago. Takes a good deal of weak tea, bread and potatoes. Complains now chiefly of flatulence, which keeps her awake during the early part of the night. Gastric splashing was to be obtained below the umbilicus, and from an examination of the material—vomited before breakfast—which the patient brought with her, it appeared that the stomach contained food residues of the day before. A microscopic examination of the vomit also showed the Oppler-Boas bacillus and sarcinæ. There was profuse pyorrhea. By appropriate treatment the case was brought back to the stagnation stage, and no food residues were to be obtained before breakfast.

Case 3. Neurasthenia.—Florence C., aged twenty-four, music mistress, came under observation on May 10, 1897. She complained

of emaciation, nervousness, tenderness of the scalp, weakness of the back, claustrophobia, and other morbid fears. Was afraid to go out alone. She had been rapidly losing flesh for the previous year. Was very soon tired by either bodily or mental exertion, and quite incapable of any sustained effort. With the exception of anemia to the extent of sixty-five per cent of hemoglobin, physical examination revealed nothing abnormal. The gums were very unhealthy and there were several foul and decomposing stumps. The patient was at that time under the care of a dentist, who told her that the condition of her teeth and gums depended upon her general health, and that he could do nothing for her. As treatment directed to her neurasthenic condition had effected no improvement by August 23, she was sent to the Dental Hospital, where her mouth was placed in a healthy condition. From this moment improvement was rapid, and recovery was eventually complete.

Case 5. Neuritis.—Gertrude F., aged twenty-five, dressmaker. This was a typical case of neuritis commencing in the nerves of the legs. There was numbness, tingling, and tenderness along the course of the anterior tibials, with marked weakness of the muscles. On walking, she dragged her feet to a slight extent. Pyorrhea and stumps. Recovery in six weeks on treatment directed to the mouth. I may add that she had been treated for some weeks at St. Bartholomew's with electricity and arsenic without effect.

Case 6. Pseudo-angina—.James J., aged thirty-one, bookmaker, attended upon February 15, 1897, complaining of attacks of severe pain in the cardiac region which ran down his left arm as far as the elbow. Nothing abnormal could be made out in the heart, and the other organs of the body were also apparently healthy. He had not indulged to excess in either tobacco or alcohol. Bad pyorrhea and suppurating stump in the mouth. On restoration of the mouth to a healthy condition the patient recovered without any special treatment except an ordinary tonic.

On perusing the cases recorded by Dr. Hunter in his book, it is unfortunately evident that these have not been studied from the most modern standpoint of gastro-enterology, and consequently do not teach as much as they otherwise might. Nothing, for instance, is said as to the time relations of the symptoms to meals, and apparently the stomachs have not been examined either as to their muscular tone or as to the condition of their secretions. Noth-

ing is mentioned as to gastric splashing, or the condition of the stomach contents after a test meal. We can therefore only guess as to their precise nature. Case 1: "The patient suffered from severe intermittent sickness and gastric pain of eight months' duration, with loss of weight and increasing weakness." Case 2: "An old gentleman. . . . He came complaining of sickness and nausea, with disturbance of digestion and a foul taste in his mouth." Case 3: "Chronic indigestion, gastric pain, gastric catarrh. Pain two or three hours after taking food, with peculiar sinking feeling relieved only by eating." Case 5: "Gastric discomfort, gastric catarrh." In all these cases there was pyorrhea, upon the cure of which the gastric symptoms subsided. From the study of these cases it is apparent that they were probably chronic gastritis.

Within the last few weeks a typical case of gastric neurasthenia has been under my own observation. Miss M., a young lady twenty-four years of age, has suffered for the last two years from indigestion, which was diagnosed by her physician as gastric neurasthenia. Her symptoms were anorexia, and usually nausea after swallowing one or two mouthfuls of food. Pain, fullness, and flatulence during the digestive period, with occasional vomiting. Her medical adviser had made a physical examination, and gastric splashing was obtained during the whole of the interval between meals. There was no retention or stagnation of food, and no food residues in the stomach before breakfast. The gastric juice was apparently normal in composition. The patient had been getting thinner for some time. On examining the mouth there were seen several necrotic stumps, partly overgrown with hypertrophied and extremely sensitive gums, and typical bad pyorrhea, pus exuding from the tumefied tissues around all the teeth upon the slightest pressure. The lower anterior teeth were quite loose, the odor resembling that of decayed cabbage. The breath was extremely offensive, and the tongue furred. The case was taken in hand *secundum artem*, and even before the termination of the treatment the symptoms subsided, appetite developed, pain, fullness, and nausea disappeared, and the patient began to put on flesh. I mention this odor of decayed cabbage, as it appears to be typical in chronic pyorrhea.

B. *Systemic Effects from the Absorption of Toxins. Toxic Neuritis.*—This affection appears to be fairly common. Dr. Hunter

records the following cases: D. P., aged thirty-three, scene-shifter. Ill two and a half months, with wasting in both arms. Illness began with diarrhea and pains in the stomach, lasting about three weeks. About a month afterward noticed weakness in the hands, with feeling of stiffness, and the weakness extended up both arms. It was accompanied by a sensation of pins and needles. His mouth presented a condition of intense oral sepsis, dirty black teeth, many of them loose, and of extreme gingivitis. This case improved in a marked manner when the mouth was put in an aseptic condition.

Mary G., aged thirty-three, confined three months ago. Complaint began with wasting, weakness, and numbness of muscles of left thumb and fourth and middle fingers. Pain up the arm to the left shoulder; great nervousness. Illness began with numbness in fourth and fifth fingers, followed by pins and needles sensation. Some tenderness of left median nerve. Marked wasting of muscles of thenar and hypothenar eminences. Denture in upper jaw covering a number of teeth broken off; most intense gingivitis around roots. After treatment declared herself wonderfully better; has lost her sallow look and is fresh complexioned; can now grasp freely with the left hand. Besides these Dr. Hunter records several other similar cases, all of which were successfully treated when the oral sepsis was removed.

Gout and gouty glycosuria.—Korner draws attention to the connection of these affections with pyorrhea alveolaris. In his opinion, among the most important results of pyorrhea are the affections of metabolism, especially gout and diabetes. In the great majority of pyorrhea cases he finds sugar in the urine, and so much is this the case that he makes a careful examination of it in all cases where he finds the gums thus affected. He finds that pyorrhea is such a very early sign of a probable glycosuria that in many cases he has been enabled to make a diagnosis when the disease would not otherwise have been suspected.

As an apposite illustration of these facts I may mention the case of a patient who was under the care of Dr. Herschell, and whose mouth was subsequently treated by my colleague, Dr. Bradner-White. Mrs. W., a lady aged sixty, had been troubled for some years with subacute gout in the feet and ankles, and about the end of 1899 developed gouty eczema upon the legs, arms, and abdomen. She then came under the observation of Dr. Herschell, who dis-

covered both sugar and albumin in the urine and a very bad pyorrhea. The discharge from the gums was so excessive that it literally soaked the pillow during the night, and necessitated the use of several handkerchiefs during the day. The odor from the mouth was so offensive that one could hardly remain in the same room with her. Needless to say, her appetite was lost, and she had emaciated considerably during the past few months. On examination of the mouth a frightful condition of things was to be seen. A small gold plate carrying the two lower central incisors was immovably fixed in position by a gold clasp on either side. Over these the granulations from the gums had grown, and similar tongues of flesh were present between nearly all the lower teeth, in some cases overlapping the crowns. Her dentist, who had charge of the mouth, had particularly cautioned her not to remove this plate on any consideration, and it appears he had seen her frequently without noticing the pyorrhea. The treatment was entirely successful. To save time, the tips of the granulating gums were removed with scissors, the plate extracted, and removal of the deposits effected; a spraying with hydrozone and application of silver nitrate soon brought the gums to a healthy condition. It was subsequently found possible to draw the teeth in the lower jaw together in such a manner that artificial teeth were not required. As the result of the treatment the eczema promptly subsided, the sugar disappeared, the appetite returned, and up to date the patient has had no return of her troubles.

Chronic rheumatic arthritis.—Mr. McNamara, in the course of a discussion upon the relations of rheumatism, made the following remarks: "He commented on the toxic origin of rheumatoid arthritis, and said that it was evident that some of the chemical substances produced by specific microorganisms led to rapid destruction of tissue, as witnessed in pyemia. . . . He quoted a case in which a woman of twenty-five suffered from typically deformed and fixed joints, attributed to the absorption of septic matter from the sockets of teeth affected with dental caries." This case, evidently from the description a typical one of pyorrhea alveolaris, was successfully treated after the mouth had been put into a condition of health, although all previous treatment had been in vain.

A vicious circle may frequently be established where pyorrhea upsets general nutrition and lowers the resisting power of the gums to the external agents acting upon them, thus aggravating the dis-

ease, which in turn keeps up the gastric disturbances and produces nervous trouble by absorption of toxin from the pus continually swallowed.

Diagnosis.—According to Dr. Hunter, the majority of the sufferers from chronic oral sepsis have a dirty, ashy-gray look, and suffer from general languor, irritability, and feelings of intense depression. When, in addition to these, we find a gastritis or neuritis, or a gouty rash, and, moreover, on examining the mouth find the well-known signs of pyorrhea or septic stumps, we shall be justified in concluding that the general constitutional condition may very possibly be the result of the local condition.

Treatment.—We now come to the most important part of my subject. How shall we best cure the cases of pyorrhea alveolaris which come under our hands? I think that we are all agreed as to the first stage of treatment—the removal of all deposits from the teeth, both above and below the edges of the gums. This must be done thoroughly, as the smallest little spicule of calculus left behind will keep up the irritation. We must not therefore grudge the time which it is necessary to expend, and our patients must also be educated up to the point of not grudging us fair remuneration for our work. Many sittings are often required to complete the work, and patience is necessary on the part of both dentist and patient.

It is in the subsequent treatment of the pus-pockets that differences of treatment arise. One could fill many lines of print with a bare enumeration of the different drugs and chemicals which have been applied to the long-suffering patient—trichloracetic, sulfuric, nitric acids, copper sulfate, hydrogen peroxid, carbolic acid, quinin sulfate, etc., to say nothing of cupric electrolysis and the actual cautery, all of which have their advocates. Without discussing the respective merits of these, I shall confine myself to briefly indicating the method which I have adopted in my own practice, and which I have found to give me the best results. First remove all the deposit which it is possible to get away with instruments, and then with a flattened, fine point of soft wood rub the necks and down on the roots with aromatic sulfuric acid, to be followed immediately with sodium bicarbonate. This process leaves the pockets absolutely clean and the roots smooth. All will agree that the perfect removal of all irritating bodies is a *sine quâ non* for further treatment. For the treatment of the diseased conditions of the gums I

rely upon preparations of silver, which are without doubt the most efficient germicides for our purpose, and at the same time have a most happy effect in stimulating the gums to a healthy action and in hardening them by their powerful astringent properties.

I use the nitrate in the form of a saturated solution carried on a bit of absorbent cotton, or the pure crystals melted on to the point of a platinum broach, and I use argentamin. This latter drug, prepared by Schering, is a solution of silver nitrate in ethylendiamin. It is a powerful antiseptic and germicide, and has the great advantages over silver nitrate that it is alkaline, in reaction does not precipitate chlorids or albuminoids, and penetrates deeply into the tissues. It is thus an ideal agent for the treatment of pus-pockets. It is best to begin with a weak solution, say ten per cent, and subsequently to double this strength. I apply it to the interior of the pockets with a tiny piece of absorbent cotton wrapped round a fine silver probe. The result of this treatment is often almost miraculous. In a very few days the whole appearance of the mouth is altered, and the discharge ceases; the gums become firm and contract tightly around the teeth, and an application at intervals for the next few months will in most cases practically cure this obstinate affection. As a subsequent mouth-wash to be used with a brush, I have obtained the best results from preparations containing salicylic acid and ratany, to be twice used daily. These two drugs seem to possess peculiar properties in maintaining the gums in a healthy condition and the mouth in an aseptic state.— *Cosmos, Jan., 1902.*

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OBTUNDENTS—DENTAL. By Charles S. Moore, D.D.S., Philadelphia. Read before the Penna. Assn. of Dental Surgeons, Dec. 10, 1901. An obtundent, medically speaking, is an agent having the power to dull or overcome pain, a soothing application, or a local or partial anesthetic. It may be a substance which sheathes a part and so blunts irritation; a bland, oily, or mucilaginous application, a demulcent. We have as examples, opium and its derivatives, the various modifications of cocain, gum arabic, glycerin, olive oil, etc. The anesthetics, when their effects are limited to a mere obtunding of sensation, are generally termed obtundents. We may in a general way state the difference between an anesthetic and an obtundent by saying that an anesthetic is an agent completely obliterating sensation; as in most cases anesthetics

practically produce absolute unconsciousness, partial or general, while obtundent merely relieves the painful sensation. Some agents are properly classed under both heads; for instance, the various ethers, which are obtundents or anesthetics accordingly as they are applied or corresponding to the degree of their effect. Common usage accepts this liberal if not exact construction of the term, and many medicaments, because of their ability to produce semi-insensibility or local anesthesia, are classed as obtundents. For convenience sake the first classification will be made with this in view, and will be designated, first, those relieving pain, as oil of cloves; and second, those producing an insensibility to pain, as cocain.

To the first class belong the mild-acting obtundents, oil of cloves, ordinary chalk, milk of magnesia, and spirits of camphor. In the second class are those drugs producing an insensibility to pain, as cocain, nitric acid, carbolic acid, ethyl chlorid, etc. It is a convenience to again subclass these drugs in accordance with their therapeutic action, i. e.: 1. Those acting upon the nervous elements of the dentinal tubules, producing paralysis and thereby interfering with the transmission of pain impressions, such as cocain, the ethers, etc. 2. Those acting upon the protoplasmic substances in the tubuli, coagulating the albumins of the same and thereby destroying their ability to convey pain sensation. To this division belong carbolic acid, nitrate of silver, etc. 3. Those acting by dehydrating the contents of the tubuli and thus removing the most potent element that assists in the transmission of pain impulses. Examples: alcohol, chlorid of zinc, and hot air. 4. Those neutralizing acid conditions directly causative of hypersensitiveness and thereby destroying the cause of pain, such as bicarbonate of soda. 5. Those disintegrating the protoplasmic contents of the tubuli and thus destroying the means of transmitting impressions; such as chromic and nitric acids.

Under the different class headings, according to clinical references, the peculiar action of drugs used in general dental practice as obtundents is as follows: Under Class 1, those paralyzing the nervous elements of the tubules are: Cocain. Dr. Jeay, in a paper read before the Third International Dental Congress, remarks that, "In the absence of electrical appliances, hot air and saturated solutions of cocain and menthol in alcohol are the only means that give good results without disturbing the physiological integrity of the

pulp." Cocain hydrochlorate dissolved in water is not efficient on account of the solution having but little penetrating power. The diffusion of the moisture of the tooth in the solution of cocain is not great, inasmuch as the two fluids have about the same index of capillary atttraction. A very penetrating preparation of cocain, known as vapocain, made by McKesson and Robbins, overcomes the fault of the aqueous solution, as the salt is dissolved in ether, which has a higher index of attraction than water. Dr. S. G. Perry remarks of vapocain, "I have not met a single case where I have not been able by patience to produce a marked effect on the tooth, and make it bearable in a few minutes." Instructions for its use, as given in the maker's circular, are as follows: Apply the dam and dry the cavity with hot air, place a pellet of cotton in the cavity, and drop vapocain upon it until saturated; allow the cotton to remain, keeping it thoroughly saturated with the medicament from two to five minutes. To prevent too rapid evaporation it is wise to cover the cavity with a piece of rubber.

In Gorgas' "Dental Medicine" the following prescription is given: Cocain hydrochlorate (crystals), gr. x; tragacanthe glyceritum q.s. M. Sig.—Insert a minute portion in the cavity half an hour before operating.

Dr. E. A. Bogue strongly recommends veratria in combination with carbolic acid, and suggests the following formula: Veratria, gr. vi; pure carbolic acid, gr. vi: absolute alcohol, m. vi; glycerin, gtt. v. He directs that after the tooth is protected with rubber-dam the medicament shall be applied and the operator proceed with some other case; on returning to the first one it is cleansed with alcohol, and after air-drying the cavity the excavation is made.

Under Class 2 the coagulants find an appropriate place. Carbolic acid has been perhaps most frequently used, but it is not of much service when an immediate effect is desired. Partially air-drying the cavity before its application is a decided advantage; it is better, however, to seal it in the cavity for a few days. It may be combined with morphia, tannic acid, or oil of cloves. Dr. E. T. Darby advises as follows: Dry the cavity with hot air, then apply absolute alcohol, dry again, and apply carbolic acid. This procedure is to be repeated three times. Carbolic acid combined with an equal part of caustic potassa forms the well-known "Robinson's Remedy," an efficient obtundent. It is also an active caustic and calls for care

in its use. Chlorid of zinc is applicable in all cases where cavities do not closely encroach upon pulp territory; it may be used in these with comparative safety if the deeper portions are protected by an insoluble covering, such as chloro-percha. As a rule it is well to restrict its use to superficial cavities, using it in deeper ones only when milder remedies have failed to produce the desired effect. The severe pain usually following its application may be much reduced by first applying carbolic acid, which does not in any manner interfere with its action. While it may be used in solution, crystals of the chemically pure salt are more convenient, and are more readily restricted to the surface upon which its effect is desired. It is well to remember that it may have a continuing action. It is now recognized that the idea formerly held that coagulants were held in check by the product of their union with albumin is an error; they readily pass through this and continue their effect until exhausted chemically. Zinc chlorid appears to have a double action—it not only coagulates the albuminous contents of the tubules, but also abstracts the water therein; hence it is more active in the form of crystals.

Nitrate of silver, on account of the discoloration which usually follows its application, can be used only in superficial cavities in the back part of the mouth and as an application to the deciduous teeth. Wherever this discoloration is not objectionable, the drug is invaluable. It is particularly useful in relieving hypersensitiveness at the necks of teeth in cases of gum recession and erosion. It must, however, be used with care. Dr. Truman demonstrated a few years ago that nitrate of silver was a most penetrating coagulant, and suggested that it might prove as dangerous to the vitality of the pulp as is zinc chlorid. His conclusions were at that time disputed; they have since been confirmed and are now generally accepted. Arsenious acid is mentioned only to be condemned, it should never be used except where devitalization of the pulp is desired.

The above list does not by any means exhaust the list of available drugs classed as coagulants. Most of the essential oils have this property in a greater or less degree, and in many cases are to be preferred to more active agents.

Under Class 3, those dehydrating the protoplasmic contents of the tubuli, heated air may be given first place. Used alone it is effective, not alone on account of the heat it conveys producing evaporation, but also because the heating process has deprived it of

a portion of moisture which it again takes up from the dentin against which it is directed. Absolute alcohol, which has a strong affinity for water, rapidly combines with that in the tubules, which is dissipated with the alcohol by evaporation. Chlorid of zinc also dehydrates the contents of the tubules by combining with the water contained therein.

Sodium bicarbonate is the principal type of medicaments included under Class 4, those neutralizing acid conditions causative of hypersensitiveness. It is, in fact, about the only one that has proved desirable in producing a condition of toleration to operative procedures. Dr. E. C. Kirk remarks concerning this agent, "I find sodium carbonate to be a local sedative and obtundent in the treatment of sensitive dentin, not successful in every case, but having a marked effect in allaying hyperesthesia in very many instances. It is best applied in the form of a thick paste to a perfectly dry cavity. The application causes momentary pain, which is followed by its rapid cessation, and in most instances by a decided anesthesia of the dentin. As pain returns during the operation of excavation the application must be renewed." Eroded surfaces and hypersensitive cavities on the labio-cervical aspect of the molar teeth are locations where this treatment is successfully used. The bicarbonate, however, is usually preferred.

Under Class 5, drugs destroying the protoplasmic contents of the tubuli, chromic and nitric acids are the most pronounced examples. While chromic acid is a coagulant, it at the same time rapidly destroys, decomposing the organic substance of the tooth in the same manner as nitric acid. They are of service in extremely sensitive, very shallow cavities. Before attempting their use the adjacent tissues should be carefully protected. They are applied by being carried in small quantity upon a gold probe.

No mention is herein made of cataphoresis, for the reason that the subject cannot be treated in a small space, nor by one who has had no practical experience in its application. Excluding it, there still remains a sufficient number of drugs for intelligent treatment of hypersensitive dentin. Indeed, the necessity for treatment arises from so many differing causes that satisfactory results can be obtained only through proper study, first, of the causes, and second, of the agents curative of the disorder. It has well been said that a remedy which may in one case give certain relief may in another be of but little service.

A brief mention may be made of obtunding agents used upon the soft tissues in such operations as preparing roots for crowning, or for fitting the same. A few crystals of cocain hydrochlorate dissolved in alcohol and applied over the gum will render an unpleasant operation bearable. Peronin (benzylic ether of morphia) is recommended by Dr. Benvenuti, in two per cent solutions in hot water. When applied to the gums for two or three minutes sufficient anesthesia is produced for extraction of the teeth.—*Brief, Feb., 1902.*

* * *

SILVER NITRATE ON INFLAMED MUCOUS MEMBRANES. However, as an astringent to the mucous membrane of the nose, the extract of suprarenal capsules or its newly discovered alkaloid, adrenalin, is the most powerful known. The alkaloid is active in the strength of one to ten thousand parts of water, and within sixty seconds after its application blanches the nasal mucous membrane to a creamy white. Whether the irritant or sedative effects of silver nitrate predominate depends largely upon the character of the epithelial layer of the mucous membrane to which it is applied. If a sixty-grain solution be painted upon the posterior wall of the pharynx the irritating quality is manifested and produces discomfort persisting for some time. If, however, this solution be painted upon inflamed tonsils and the inflamed lateral wall of the pharynx, the primary irritant qualities of the nitrates are scarcely perceptible, and the procedure is followed by a sense of great relief and comfort. Painting the lateral walls of the pharynx with a sixty-grain solution two or three times a day is one of the best methods of aborting acute pharyngitis and tonsilitis. The reddened parts are at once blanched, partly as the result of the astringent effects of the silver and partly as the result of the formation of a closely adherent organic compound of the silver. The sedative effects of the application are so marked that the patient is usually able to at once swallow without much discomfort. The posterior wall of the pharynx should then be painted with a twenty-grain solution of protargol. This treatment, if repeated twice or thrice a day for two or three days, will in a large proportion of cases abort phlegmonous tonsilitis.—Dr. E. B. Gleason in *Therapeutic Gazette.*

* * *

PHYSICIAN'S PRESCRIPTION. The following is a summary of the common sense and legal status of the physician's prescription,

so far as it has been defined, according to Jervey: 1. The patient has no legal nor other right to demand a written prescription or written directions from the physician. 2. It is right and wise that the druggist demand and procure from the physician his written orders for the compounding of prescriptions. 3. The physician has the undoubted right to designate what pharmacist shall fill his prescription. 4. The written prescription is simply an order from physician to pharmacist. It is, through courtesy and by virtue of custom and convenience, handed to the patient for transmission; but the latter has not at any time the slightest right of possession in the instrument. 5. The druggist has at least the right of permanent guardianship (perhaps the outright possession) of the prescription, and he must keep it on file for reference and for any form of proper investigation. 6. There can be no right, extenuation or excuse for a copy of a prescription, with physician's name attached, to be taken by druggist, patient, or any one else, without the authority of the physician. 7. The careful physician should invariably retain a carbon-paper facsimile copy of every prescription he writes. 8. The druggist has a legal right to utilize any formula that is uncopyrighted that may fall into his hands, but he cannot, unauthorized use the name of its author in connection with it. In most states, however, statutes would bar his selling intoxicants or other poisons except by direct order of physicians. 9. If a druggist refills a prescription without the order of the physician who wrote it, he does so on his own responsibility, and he has no legal or moral right to leave or place the physician's name on the container.—*Jour. Am. Med. Assn.*

LEAD LINE UPON THE GUMS AN IMPORTANT FACTOR IN THE DIAGNOSIS OF LEAD POISONING.—Sir W. R. Gowers (*Lancet*) discusses lead and arsenic poisoning. He places great stress on the lead line on the gums as an aid to diagnosis. In rare cases it may be absent, but far more frequently it exists only in fragments. It may be at but two or three isolated spots, or at the tips of the projections of the gum between the teeth. Both the upper and the lower jaw should be carefully searched with a magnifying glass. If the symptoms of the patient are such as to suggest lead, and there is no line traceable on any part of the gums, one may be confident that it is not at work, provided the state of the gums is such as would give rise to it, meaning by this that the gums in places do not adhere closely to the teeth, thus allowing the deposition of albuminous material from the food, with which the lead combines, forming the sulfid. But if the gums are very perfect lead as a factor in disease cannot be thus eliminated.

Letters.

THE BOSS AND DOCK MEASLEY CONFER ON THE SUBJECT OF DENTAL LEGISLATION.

(As Told by the Office Boy.)

The Boss he's took a Great Shine to Dock Measley lately. He goes to see him most every day. Says he to me, "James, there's a Rising Young Man in dentistry, don't you forget it. Dock Measley's young, an' some thinks he's Offul Fresh, but you Watch Out an' you'll see where he Lands after a While. He's a Comer, James, no mistake about that. He ain't only Twenty-Four years old, but he's got the Gumption o' lots o' Dentists of a Hundred an' Twenty Four. It won't do to Underrate him, James, even if he ain't got a Prince Heinie polish as yet. After he's Bumped around the country in Parlor Cars a few years, attendin' State Dental Society Meetings, you'll see him lookin' Slick as a Seven Hundred Doler Seal-Skin Sacque."

One Mornin' the Boss he was at Dock Measley's offis, an' a lady she' called a-purpose to Abuse him about a Tooth she wouldn't let him Fill Right. So I said I'd go after him, an' she said fer me to go an' to Hurry him Up, 'cause she was a-layin' fer him, an' it was her purpose to give him Perticular Fits. So I went, an' I told him the Cook wanted him to Fetch some German Soap fer Scrubbin' when he Come, an' I never said nothin' about the Woman what was Waitin', 'cause I knowed it wouldn't specially interest him. The Boss he said he'd Bring the Soap, an' then he settled down in his Chair, an' he looked at Dock Measley reel Respectful, like he Reelized how Kind an' Obligin' Dock Measley was to Learn him all about Dentistry. I set down behind the Door, where the Boss wouldn't See Me too easy, an' perhaps send me Back, an' I listened to what was a-goin' on.

Directly they started to talking about Dental Legislation, that is making laws an' fixing things so as a Dentist he won't have no Legal Right to practice, even if he does know all about stopping Tooth Ache, an' Filling Teeth, an' Pulling 'em, an' makin' Plates an' Bridges, but will be liable to git himself Jugged, without he knows all about Diptheory, an' what the Pectoralis Major muscle

opens an' shets, an' the Symptoms of Compound Fractures, an' lots o' Things. The Boss an' Dock Measley was exchanging Views, talking about what had best be Done. Dock Measley let the Boss talk.

The Boss ain't so Stuck on Modern Measures, as he calls 'em, fer elevating the Perfession an' Dignifying Dentistry. He says, dern this Dignifyin' Dentistry; let Dentistry dignify itself! The thing needed to Dignify Dentistry is some practical scheme fer making folks Pay Up. Why don't they talk about Dignifyin' the Law, an' Medicine! He thinks some o' the men that's raisin' sech a Howl about Students not having a High-School eddication before they enter the Dental College, er not knowing no Latin ner Greek, orter be Required to pass a Examination theirselves in Two-Syllable Spelling an' Grammar. He says the Reel an' Proper way to straighten matters Out, is to Strike at the Root o' the Evil—meanin', jis' betwixt me an' you, the Dental Colleges. (What he'd like to see is the Dental Colleges completely Busted Up, an' the good old times restored when a dentist could rush through any old sort of a Job an' git Big Pay for it. He ain't in favor o' having so Menny young Dentists; says they don't Conform to Time-Honored Standards, is Conceity, an' ain't Respectful to the older members o' the Perfession.)

The Boss he said some o' these things to Dock Measley, an' Dock Measley of course never took no offense, he ranking himself among the Older Men, having been two years at the Chair. Then Dock Measley he kind o' winked, an' he sent one o' them Wireless Dispatches by the new Maccaroni Process across the Room to the Boss, an' I ketched on to it, notwithstanding they claim no Outsider kin tell what the message is. What Dock Measley said in Cipher Dispatch, (that he didn't want me to Read, yet I did read it), was this, plain as Day. Says he, "I ain't so Offul Stuck on these Legislatin' Schemes, yit I ain't so Hostile to them as I Ust to Be. They was a Time when I thought the whole business o' Legislatin' agin men practicin' dentistry without a license was a Scheme to Drive young men into the Dental Colleges an' help put Money in the Faculties' Pockets. There had to be a Pretense of Impartiality, so the Alternative was Offered of Passin' a Examination before a State Board of Examiners. My idee ust to be that in Time the Dental Colleges would manipulate things so that the State Boards wouldn't amount to Nothin', an' the only Avenue for Entrance into the Practice o' Dentistry would be through the Colleges."

Dock Measley must of seen I was Ketchin' on, anyway, fer he talked right out loud, sayin' the rest he had to say. Says he: "I say, I wasn't never so Offul Stuck on this Legislatin' Scheme, yit I Ust to let on I approved, fer fear the Perfession would think I wasn't Progressive. I was jis' out o' the Dental College, an' I was Dead Sure o' succeedin' in Practice, fer I seen the College prosperin', an' makin' this, that an' the other improvement on no Margin at all, the charges fer services rendered to the Indigent Public bein' merely fer material actually used, an' so I reasoned that by a moderate amount o' Hustlin' I could git control of a somewhat Higher Class o' Patrons, an' git Ritch in no time. But when I come to Practicin', I was led after awhile to Suspicion that the Hull Body o' recent graduates practicin' in the City was reely only Dental College Students kind o' out on Parole. They wasn't actually under Indictment fer remainin' in Town an' openin' Offices in opposition to the Dental College after Graduatin', but they was somehow left to Gather the Impression that what the Old, Established Practitioners in the City couldn't attend to, the Dental Colleges could, an' so they'd better try some Other Location. This some o' them done; others staid, an' Organized more Dental Colleges. Sometimes you'd find a Young Practitioner Offul Rabbid agin the Dental Colleges, but once he'd Started one himself, all his Maniacal Ravings would Cease.

"But now, I say, my sentiments is wholly changed. I don't Carrot Am if the State Board of Examiners doos come to be Abolished finally, an' nothin' remain fer Aspirants fer Dental Honors but to spend Four Years and Four Thousand Dolers in some Dental College. Things has took on a new Aspect of late, promisin' a brighter Future fer us members already in the Perfession. The Advanced Idee seems to be this—to limit the class of Matriculates at the Dental Colleges to them that's so Highly Eddicated in High Schools an' Colleges that when they Graduate at the Dental College they won't have no Taste fer Practical Dentistry. Which of Course means they won't come into active Competition with Practicin' Dentists. Before they'll admit them to the Dental College they've got to know Sanscrit, an' Chaldee, an' the Integration of Rational Fractions from the Ground Floor up. The Scheme 'll jist be the salvation of us Older Fellers. It's another thing; it's Salve to the class o' Dentists that's more than Haf Ashamed o' bein' only

Dentists,' an' has Utopian Notions o' Exaltin' Dentistry into the realm o' the Classics.

But the reel, savin' Clause o' the Scheme is this, the Dental Faculties knows that students that cares so Offul Mutch fer Compound Fractures, an' Adenoids, an' Rhinoplasty, an' the Exanthema, ain't sech Formjdable Rivals when it comes to Good Impressions an' Correct Bites. But they're Fine Ornaments to a Tri-State Dental Meeting, an' ef they ain't o' Mutch Weight as Dental Practitioners, they help to swell the General Average o' Perfessional Respectability. Take it all in all, it's Doubtful whether the Mass o' the Perfession is sufficiently Grateful fer what the Dental Colleges is doing fer the Perfession. It's doubtful whether there's any other Influence so well calculated to eradicate the Itch fer Practical Dentistry out of a Student, as some o' the Dental Colleges. An' yet lots o' Dentists in Active Practice is Hostile to the Colleges! They doesn't seem to Appreciate the Fact that the Dental Colleges is doing their Best to raise Dentistry in the United States to the Plane o' European Dentistry—that is, Sublimated Theory exalted far above the Sordid Demands of Practical Toothache. So I say, in Conclusion, let the Dental Colleges alone, let 'em Work Out their Beneficent Scheme. If they want to legislate, let 'em do it. They may not make many Practical Dentists, but think of the Crops of College Professors forthcoming!"

The Boss he seemed to be Deeply Impressed by what Dock Measley said. Says he, "Well, mebbe I *have* had the wrong Idee about the scheme o' Dental Legislation. I see now it's all in the Interests o' Existin' Institutions. Young men that wants to be Dentists is to be encouraged to be somethin' else, somethin' Higher than Dentists. The young man that inclines to Plaster Impressions, an' Regulatin' Appliances, an' the like, is bein' told to go to school an' master Latin an' Greek, so's he'll be capable o' Graspin' the principles o' Theoretical Medicine, when he comes to the Dental College. Then mebbe he'll conclude to be a Physician, after all. It's what I call a good Conservative Scheme. It's a protection to the Young Men against Dentistry, an' it's a Protection to Dentistry against the Young Men. I admit everybody'd orter be Satisfied."

The Boss he looked like he'd took Fresh Courage, an' could go back to the shop an' Bang his New Sterilizer out into the Alley, an' never bother no more about wiping off his Forceps, ner Nothing.

'Cause you see, there wouldn't be so Menny young Dentists comin' on, pesterin' the Older Men about Germs, an' Sterilizin', an' other things that Dentists ust to leave fer the Patient ter Tackle.

"I tell you though, Dock Measley, what the Perfession needs most of All, in my Opinion, is Colleges fer educatin' the Public up to our Perfessional Standard. I'd be in favor of Taxation fer that Purpose. Make it a Law that nobody kin come into a Dentist's Offis without he's got a Diploma in his Pocket certifyin' that he's tractable, confidin', an' prepared to Pay," said the Boss. Dock Measley looked Doubtful. "I'll tell you what I will do, Dock Contour, when I start my Dental College I'm a-goin' to adopt for our motto, 'Live an' let live.' I'm a-goin' to limit the amount of Filling to be done for Any One Patient to Thirty-Two teeth."

Cincinnati, O. FRANK W. SAGE, D.D.S.

EXTRACTION OF ARTIFICIAL TEETH.—Batsch (*Muen. Med. Woch.*) reports the case of a man who had swallowed a plate carrying several artificial teeth. It was impossible to discover the position by means of the Roentgen rays, but it could be accurately located by means of the esophageal sound, which touched it at a distance of 36 cm. from the natural teeth. An attempt to remove by means of forceps failed, and therefore the sound was reintroduced and the plate forced into the stomach, an operation that caused considerable pain. The patient was then instructed to eat large quantities of coarse vegetables, with the idea of enclosing the teeth and preventing them from injuring the intestine in their further passage downward. After several days they were actually found in a copious evacuation.

ACTION OF AMMONIA ON METALS.—G. T. Beilby and G. G. Henderson have exposed platinum, gold, silver, copper, iron, nickel, and cobalt to the action of ammonia at temperatures ranging from 400 deg. to 900 deg. In every case the physical effect of the treatment was to disintegrate the metal completely, whilst a large proportion of the ammonia was resolved into its elements. The fracture of metals which have been exposed to this action is spongy or cellular; under the microscope the metal appears as if it had been suddenly cooled while in a state of active effervescence. The penetration of the ammonia molecules into the metal is remarkably quick if the conditions are favorable. The authors believe that the physical effects which result from the action of ammonia upon metals at high temperatures are due to the alternate formation and dissociation of nitrites taking place between certain narrow limits of temperature, the reaction going in one direction or the other according as ammonia or hydrogen molecules preponderate in the gases which are in contact with the molecules of the metal at and below the surface. In several cases the formation of nitrites has been definitely proved. The absorption of small quantities of nitrogen by pure iron renders it hard and brittle like steel.—*Proc. Chem. Soc.*

The Dental Digest.

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Editorial.

DATE OF NATIONAL MEETING CHANGED.

Just at time of going to press we learn that the officers of the National Dental Association have decided to change the date of meeting to July 28-31. We will give fuller particulars in the next issue. The meeting at Niagara Falls in 1899 was probably the largest one ever held by the National, and we hope everyone will work to make this meeting still bigger and more successful.

CROWN COMPANY AGAIN RUN.

Among the many suits brought by the International Tooth Crown Co. against the members of the Dental Protective Association some months ago were several in the State of New Jersey. One of these, same being against Dr. J. S. Vinson of Newark, was docketed for trial this month, and we supposed the Crown Co. expected to prosecute the case, as it was the only one in that state in which they had taken testimony. The attorneys of the Protective Association prepared the defense, but we learned last week, greatly to our surprise, that the Crown Co. had paid the costs of the case and had it dismissed, which is positive proof that they were afraid to have it come to trial. The Crown Co. are therefore confined at the present time to the state of New York, and Judge Lacombe, ruling in that Federal District, has refused to hear any more cases until the Court of Appeals has passed on the one in which he recently gave a decision. It cannot be definitely stated when this decision will be handed down.

DENTIST-PHYSICIAN OR PHYSICIAN-DENTIST.

We would call the special attention of our readers to the article in the February Digest by Dr. O. N. Heise, entitled "Dentistry as a Specialty of Medicine," and to the article in the current issue by

Dr. Frank W. Sage, entitled "The Real Attitude of the Dental Specialty Toward Medicine." Dr. Sage's "Office Boy's Letter" in this issue also treats of the same subject from a humorous standpoint. Dr. Heise and Dr. Sage hold opposite views, and opinion generally seems to be divided as to whether dentistry is a specialty of medicine or a separate and distinct profession, capable of standing alone. Personally, we should hold a middle view. The dentist is primarily a mechanic, and a student with mechanical genius and a fair education will make a better dentist, in the general acceptance of the term, than a student utterly lacking in mechanical talent, but possessing a broad, thorough education. We do not mean by this that students with only mechanical ability should be admitted to our dental colleges, for that would soon bring dentistry to the level of a trade pure and simple. On the other hand, we do not believe students who have only a fine education should be accepted, as that would make us a class of theorists. The fact that there are to-day over one hundred dental laboratories throughout the country, doing all the mechanical work for a large number of dentists, is a sad commentary on the mechanical training or ability of the average practitioner.

First of all the student must have mechanical ability or he cannot practice dentistry, but it is just as essential that he possess a thorough general education and have a mind trained by study and observation. Otherwise, he is fit for nothing but the purely mechanical work and cannot rank as a dentist. If a student has these two qualifications, mechanical and intellectual, he should be able to obtain in the dental college all the knowledge of general medicine which he will be apt to need, and we believe all the first-class schools to-day give him that opportunity if he will embrace it. While we should urge the student to take a medical course before entering a dental college, if he has the time, money and desire to do so, we would recommend it for its broadening and deepening influences, and not because we think a man must be a physician first and a dentist next. This latter seems to be the view held in Europe, and as a consequence of the exaltation of general medicine above the dental specialty, the mass of the people over there suffer from lack of any dental service whatever.

However, dentistry in this country seems to be working out its own salvation, and if the dental colleges extend their courses of

study to meet the requirements made upon a dentist in active practice, and see to it that only well balanced students, those possessing both mechanical skill and a broad education, are admitted, we need have no fear that the reputation of our profession will suffer. The colleges deserve all credit for their continued efforts to raise the standard, and we think the matter can be safely left in their hands.

ARMY DENTISTS AND DENTAL SOCIETIES.

In the December *Review* Dr. Harlan expressed himself editorially as follows on "The Army Dentist":

"From the paper of the president of the Army Dental Board, published in the DENTAL DIGEST for November, it appears that twenty-seven of the posts have been filled and that three positions are vacant. We presume that the dental societies of this country will be glad to welcome the occupants of these posts to membership in the societies adjacent to the army posts. So far as Chicago is concerned, the membership has been proffered to Dr. W. C. Fischer, who is located at Fort Sheridan. We had hoped that all dental societies would receive the army dental surgeon as a member, as soon as he was appointed, with open arms. At the last meeting of the Chicago Dental Society a resolution was passed giving the dental surgeon at Fort Sheridan all the privileges of membership to Dr. Fischer, but not providing for his successor in case he was transferred to some other post. We think that the least a society can do is to extend the courtesy of membership to a dental surgeon without dues, as he is liable to be sent elsewhere on short notice, and it seems only fair that he should be received with open arms by his compeers. For some reason best known to the army of objectors this was denied at the last meeting of the leading local society of Chicago by the usual objectors to all forms of real courtesy. Any member of the medical corps of the army and navy goes into a meeting feeling that he is welcome to all privileges without dues. This is an invitation to all societies to extend a welcome to army dentists and full fellowship at all times and under all circumstances."

In the March *International* Dr. Truman takes issue with the above opinion, on the ground that he thinks the army dentists are abundantly able to pay the yearly dues in a dental society, and that they should not accept pecuniary favors from any source. Dr. Truman is quite right, but we think the point he brings up is not of so much importance as others which might be urged.

At the meeting of the Chicago Dental Society above referred to we opposed the resolution because we did not wish to see the society pledge itself to accept as a member, or to extend the courtesies of the

floor to, any army dentist who might be located in the vicinity, regardless of his eligibility. We did not suppose an appointment to one of these army positions was a guarantee of unimpeachable character, and inasmuch as all other dentists who are admitted to societies must be passed upon by a board of censors, we saw no reason why the army dentist should be made an exception to this rule, which is instituted merely to protect the society and its members against undesirable additions. We hope to see all these army appointees join the societies in their vicinity, as they certainly will be benefitted thereby, and should also be able to present some very interesting experiences to their confreres, but we believe they should be admitted to membership under the same conditions as are other members of the profession.

The president of the Army Dental Examining Board has publicly endorsed the opinion of the *Review*, which somewhat surprises us, as we did not suppose Dr. Marshall considered attendance upon dental society meetings essential to the successful practice of dentistry. At least, this was the inference which we drew from his devoting his time and talents to medical rather than to dental societies, and from the fact that he made the examinations for appointment to army positions of a medical rather than of a dental character. Perhaps, however, he has changed his views on this subject during the last few months, and if so we congratulate him.

RELATION OF THE RECENT GRADUATE TO THE DENTAL SOCIETY, AND VICE VERSA.

The dental colleges will soon graduate their classes for this year, so a few words on the above subject may not be out of place. We have before us a bound copy of the papers and proceedings of the last meeting of the National Dental Association, and the book is evidence sufficient that within the membership of the Asssociation are men who are thoughtful, industrious and practical. Men whose years of laborious experience have taught them that the profession of dentistry, however much it may have been, or may be at the present time, handicapped by ignorance and indifference, is now enjoying the fruits of professional evolution to as great a degree as any other industry that has blessed the human family within the last century. Every paper that was read, notwithstanding any criticism that might be bestowed upon it, is absolute proof of an

earnest desire not only for the betterment of the organization and the profession, but for a higher and brighter position of the writer. The disinterested listener certainly could not infer, either from the papers or discussions, that egotism or self-aggrandizement was the object in view.

Neither the public nor the medical profession appreciate the varied talent, the noble aspirations, and the unselfish spirit that pervade the dental profession. Many men are to-day pursuing the unobtrusive practice of dentistry who, had their energies and talent been so directed, would have been just as successful in medicine, law and other arts and sciences. Unless one has been so situated as to be familiar with the demands made upon the average practitioner, he has no idea of the range of talent he must possess who would occupy the highest position in the dental profession. There are no soft spots in dentistry; at least, your editor has never found them.

To the recent graduate these few lines will indicate the field before him, but above all things we desire to impress upon the young men entering the profession the almost unlimited advantage to be gained by association. No truer word was ever spoken than that emphasizing the glory of meeting together. The expression has been used in a religious sense, but it is just as true in a scientific, social or professional one. Though your associate or comrade should have nothing superior to your own accomplishments or knowledge, yet the friction of interchange of thought invariably stimulates and develops new ideas, so that two or more men can rarely converse on any subject without either intensifying preconceived beliefs or developing some original trend.

In the first place, each young dentist should feel it his duty to join and help support at least one society, for he is today receiving the benefits of what others have done in society work, and should reciprocate so far as lies in his power. Again, he is merely entering upon the practice of dentistry when he leaves college, and must continue to study and grow or he will be a failure. Experience is the great teacher, and the young man should take advantage of the experience of those older than himself. This can be done in no other way so well as through the dental societies. The dental journals are broadening influences, and the young man should read them religiously, but they can never supersede society work, as they lack the social element and do not make the same impression

that the article at first hand does. The social feature of society work is most attractive and valuable, and it is a notable fact that all progress and investigation has come from those men who are devoted attendants upon one and usually several dental associations.

The young men in the profession today have every advantage over the early careers of those who are now enjoying the fruit of the experience of years. Even as late as forty years ago the crude and barren conditions with which the student had to contend were discouraging almost beyond description, but the pluck and perseverance that controlled the actions of those days made the men of today. Let the younger ones in our profession therefore be mindful of the responsibility put upon them, so that they may be as reverently spoken of by the coming generations as are their elders today.

Notices.

EASTERN INDIANA DENTAL ASSOCIATION.

The Eastern Indiana Dental Association will meet at Shelbyville, Ind., May 14–15, 1902. The profession in this and neighboring states are cordially invited to attend. A. T. WHITE, Sec'y, Newcastle.

IOWA STATE DENTAL SOCIETY.

The annual meeting of the Iowa State Dental Society will be held at Des Moines, May 6–9, 1902. All reputable members of the profession are cordially invited to be present. I. C. BROWNLIE, Sec'y, Ames, Ia.

SOUTHERN WISCONSIN DENTAL ASSOCIATION.

The eighth annual meeting of the Southern Wisconsin Dental Association will be held at Madison, May 14–16, 1902. The executive committee promises a fine program, and a cordial invitation is extended to the entire profession to be present. J. H. REED, Sec'y, Lancaster, Wis.

CENTRAL DENTAL ASSOCIATION OF NORTHERN NEW JERSEY.

The annual meeting of this organization was held Feb. 15, 1902, at Newark, and the following officers were elected: Pres., J. W. Fisher; V.-P., W. H. Pruden; Sec'y, F. W. Stevens; Treas., Chas. A. Meeker; Ex. Com., C. F. A. Hane, C. W. Hoblitzell, F. E. Riley, W. M. Gould, H. P. Marshall.

F. W. STEVENS, Sec'y, Newark.

WISCONSIN STATE BOARD OF DENTAL EXAMINERS.

A meeting of the Wisconsin State Board of Dental Examiners for the examination of candidates will be held in Madison, at the State Capitol, beginning May 13, 1902, at 9 a. m. Candidates must come prepared with

rubber-dam, gold and instruments to demonstrate their ability in operative dentistry.

H. L. BANZHAF, Sec'y, Manitowoc, Wis.

CONNECTICUT STATE DENTAL ASSOCIATION.

The thirty-eighth annual meeting of the Connecticut State Dental Association will be held at Hartford May 20-21, 1902. At last year's convention over 200 dentists were present. Every effort is being made to have a large and interesting meeting this year, and a large attendance is expected. Exhibitors desiring space will communicate with the Chairman of the Executive Committee, Dr. Geo. O. McLean, Hartford, Conn.

F. HINDSLEY, Sec'y, Bridgeport.

ILLINOIS STATE DENTAL SOCIETY.

The Illinois State Dental Society will meet in annual session at Springfield, Ill., May 13-15, 1902. Every day will be full of good things—practical papers by practical dentists and practical discussions of practical subjects by practical men. Clinics of all kinds, from the filling of deciduous teeth to the most extensive porcelain bridge, with or without saddle, will be given—practically a post-graduate course in dentistry. Every one attending will receive something of real benefit to take home with him.

J. W. CORMANY, Ex. Com., Mt. Carroll.

NATIONAL DENTAL ASSOCIATION, SOUTHERN BRANCH.

The fifth annual meeting of the Southern Branch of the National Dental Association was held at Atlanta, Ga., Feb. 18–21, 1902. The following officers were elected for the ensuing year: Pres., L. G. Noel, Nashville; 1st V.-P., Geo. S. Vann, Gadsden, Ala.; 2d V.-P., W. G. Mason, Tampa, Fla.; 3d V.-P., John R. Beach, Clarksville, Tenn.; Treas. (reelected), B. D. Brabson, Knoxville, Tenn.; Cor. Sec'y (reelected), C. L. Alexander, Charlotte, N. C.; Rec. Sec'y (reelected), S. W. Foster, Atlanta, Ga.; Annual Essayist, J. A. Chapple, Atlanta; Ex. Com., J. E. Chace, Ocala, Fla.; J. P. Gray, Nashville; W. H. Weaver, Lagrange, Ga.

ALABAMA STATE BOARD OF DENTAL EXAMINERS.

The Alabama State Board of Dental Examiners will meet at Tuscaloosa, Ala., May 12, 1902. In addition to the regular written examination there will be the following requirements: Each applicant must fill at least two teeth, approximal cavities, one with gold and the other with alloy, the work to be done under the immediate supervision of the board, and the board to pass upon suitable selection of cavities. The board will try to furnish patients, but failing to do so, applicants for license must find their own subjects and also bring instruments and material. Each applicant must bring an upper denture of not less than eight teeth ready for soldering, hard solder required, which work must be done under the supervision of the board.

T. P. WHITBY, Sec'y, Selma.

SOUTH CAROLINA STATE DENTAL ASSOCIATION AND STATE BOARD OF DENTAL EXAMINERS.

The thirty-second annual meeting of the South Carolina State Dental Association, and the regular meeting of the State Board of Dental Examiners, will be held at Charleston May 13-15, 1902. All dentists residing in the state are invited to be present. Visiting dentists from other states will be cordially welcomed. This will be an excellent opportunity to attend the exposition and to visit the historic "City by the Sea" and spend a few days of pleasure with the dentists of the old Palmetto State.

J. E. BOOZER, Cor. Sec'y, Columbia, S. C.

ILLINOIS STATE BOARD OF DENTAL EXAMINERS.

The next regular meeting of the Illinois State Board of Dental Examiners, to examine applicants for license to practice dentistry in this state, will be held April 30–May 3, 1902, inclusive, at the College of Dentistry, University of Illinois, Harrison and Honore Sts., Chicago. Candidates must furnish their own patients, and also come provided with the necessary instruments, rubber-dam and gold, to perform practical operations and such other work as is deemed advisable by the board. Those desiring to take the examination should matriculate with the secretary at least ten days before the date of meeting. The examination fee is $10.

J. G. REID, D.D.S., Sec'y, 1006 Champlain Bldg., Chicago.

RESOLUTIONS ON DEATH OF DR. HENRY B. NOBLE.

At a special meeting called for the purpose, the Board of Dental Examiners for the District of Columbia, by unanimous rising vote, adopted the following resolutions:

WHEREAS, Death has suddenly taken from us our most beloved and distinguished associate, Dr. Henry Bliss Noble, and

WHEREAS, In his relations with us he was the soul of honor, always kind, genial, generous and helpful, a man of unselfish disposition, who ever labored to advance the best interests of all, therefore be it

Resolved, That this Board, gratefully cherishing his memory and keenly feeling his loss, desire to spread this expression of their appreciation upon their records.

Resolved, That a copy of these resolutions be transmitted to his family and to the dental journals.

M. F. FINLEY,
C. W. APPLER,
H. J. ALLEN,
J. H. LONDON.

LATEST DENTAL PATENTS.

11,956. (Reissue) engine plugger, C. H. Seeger and N. Dedrick, Manitowoc, Wis.

689,158. Fastening for artificial teeth, A. Bischoff, Philadelphia.

689,589. Dentists' cabinet, W. G. Hullhorst, Toledo, O.

689,596. Dental tool, S. W. Platt, Park City, Utah.
690,792. Bunsen burner, C. W. Taylor, Sioux.
691,092. Air chamber former, L. Arndt, Jersey City, N. J.
691,550. Mount for diatoric teeth, H. M. Justi, Philadelphia.
691,581. Dental floss holder, A. Baumeister, Hagenau, Germany.
691,694. Dental pliers, A. Aderer, et. al., New York.
691,695. Dental instrument case, A. Aderer, et. al., New York.
691,753. Dental handpiece, F. W. Dean, Des Moines, Ia.
691,763. Dental instrument, W. E. Harper, Chicago.
692,281. Mouth prop and mirror, W. Hare, Augusta, Ill.
692,294. Dental lamp, H. J. Jaeger, New York.
692,582. Dental instrument, N. T. Yager, Louisville, Ky.
692,708. Toothbrush and powder cabinet, C. T. Price. Washington, D. C.
692,713. Dental mandrel, B. Rubinson, Philadelphia.
693,349. Dentifrice, M. H. Fletcher, Cincinnati, O.
693,350. Toothpowder package, M. H. Fletcher, Cincinnati, O.
693,884. Artificial tooth-crown, E. Nagy, Budapest, Austria.
694,021. Holder for dental devices, J. A. Mead, Corry, Pa.
694,526. Chip blowing attachment for engine, W. W. Burgin, Richmond, Ky.
694,683. Chair back-rest, G. Sibley, Philadelphia.
694,684. Chair head-rest, G. Sibley, Philadelphia.
695,092. Dental floss holder, J. W. Cowan, Geneseo, N. Y.

DESIGN.

35,776. Dental cabinet, F. E. Case, Canton, Ohio.

IN MEMORIAM.

At the regular meeting of the St. Louis Dental Society, held March 4, 1902, the following report was read and adopted:

Dr. Burt Barry was born July 26, 1871, his parents, Mr. and Mrs. L. T. Barry of Mt. Sterling, Ill., being old settlers in Brown Co. and residing there at the time of his birth. His early education was in the public schools at home and in the military schools at Salina and Orchard Lake.

In 1895 he entered the Missouri Dental College and graduated in the class of 1898. Soon after graduating he opened an office in St. Louis. For the first year he was associated with Dr. W. W. Gardner and the remainder of the time with Dr. G. W. Loesch. During the summer of 1901 he had a severe illness from which he never fully recovered. Later he went to Europe; there he remained long enough to reach the belief that the London climate was best for his health, so decided to live there for at least two years. Making arrangements to that effect, he came back to this country to purchase an American dental outfit for an English dentist with whom he expected to associate, expecting to make the move in March. On his return he spent a short time in his St. Louis office, then went to New York City, and on January 17, 1902, was married in Philadelphia to Miss Marie Peterman, a much esteemed lady of that city. Then he went to Mt. Sterling to visit his parents and friends. There on the morning of February 15 he was found dead in

bed, having died without a struggle to warn his family. His wife was in Philadelphia at the time of his death, but reached Mt. Sterling in time to attend the funeral. His remains were interred in the cemetery on the outskirts of Mt. Sterling on February 18. His wife, parents, one brother and three sisters survive him.

Dr. Barry soon after graduating became a member of our society, and just before his severe illness was preparing a paper on "Dental Materia Medica" to be read before the society.

In college "Burt," as the boys called him, was studious and industrious, aiming to make the best of his opportunities, and he kept up his studious habits after entering practice.

Dr. Barry was prominent in the Jefferson Club during its early history. Personally he was affable, courteous and gentlemanly always, and made friends readily. He was fond of athletics, in several branches of which he was skilled.

JOHN G. HARPER,
F. F. FLETCHER,
O. H. MANHARD,
} Committee.

News Summary.

JAMES NOBLES, a dentist at Hawthorne, Fla., died March 9, 1902.

E. B. KELSY, 48 years old, a dentist at Glen's Fork, Ky., died Feb. 22, 1902.

MORDECAI PRICE, 80 years old, a dentist at Fallston, Md., died March 5, 1902.

P. B. JACOBS, a dentist at Henry, Ill., died suddenly Feb. 12, 1902, from paralysis.

C. P. WILLIAMS, a dentist at Indianapolis, died March 2, 1902, from malarial fever.

J. B. LOUD, 45 years old, a dentist at Cincinnati, O., died from consumption Feb. 24, 1902.

T. J. KEY, a dentist at Eastman, Ga., died suddenly from congestion of the lungs March 1, 1902.

A. W. KINGSLEY, 86 years of age, a dentist at Elizabeth, N. J., died suddenly March 3, 1902.

W. M. SPEAKMAN, 53 years old, a dental dealer at Philadelphia, died Feb. 8, 1902, from paralysis.

M. E. LOVEJOY, 40 years old, a dentist at Mt. Morris, N. Y., died Feb. 12, 1902, from consumption.

W. P. KOOGLE, 39 years old, a dentist at Pemberville, O., died suddenly from erysipelas Feb. 24, 1902.

G. W. EMERSON, 79 years old, a retired dentist at Barnstead, N. H., died Feb. 26, 1902, from heart disease.

J. H. ALEXANDER, 71 years old, a retired dentist at Mystic, Conn., died Feb. 19, 1902, after a long illness.

WHAT "DR." MEANS.—"Dr." is an abbreviation frequently used to express the relation of a patient to his dentist.

BURT BARRY, 31 years old, a dentist at Mt. Sterling, Ill., died very suddenly from heart disease Feb. 15, 1902.

J. L. MCQUOWN, who was regimental dentist of the 9th Illinois Infantry during the late war, has been declared insane.

F. I. DIAMOND, a dentist at Philadelphia, graduate of the Philadelphia Dental College, died March 8, 1902, of pneumonia.

C. HOLLINGER, 40 years old, a dentist at Abbottstown, Pa., died suddenly Feb. 23, 1902, from congestion of the lungs and heart disease.

BRIBERY.—A Prussian dentist who is running for office offers to extract free of charge the teeth of all citizens who will vote for him.

CHRISTIAN FENGER, 61 years old, a surgeon of Chicago with a world-wide reputation, died suddenly March 8, 1902, of pleuro-pneumonia.

R. N. HUDSON, 67 years old, and in the active practice of dentistry at Auburn, N. Y., for forty-seven years, died from heart disease Feb. 21, 1902.

WASHINGTON EXAMINING BOARD.—The governor has appointed Dr. Geo. W. Stryker of Everett as a member of the state board of dental examiners.

R. C. MACKALL, 80 years old, a dentist at Elkton, Md., died Feb. 16, 1902. According to newspaper report he was the first graduate in dentistry in the world.

C. H. BUCKLEY, 33 years old, a dentist at Newburyport, Mass., died from a nervous affection Feb. 20, 1902. He was a graduate of the Philadelphia Dental College.

ODONTOLOGICAL SOCIETY OF WESTERN PENNSYLVANIA elected the following officers on March 13, 1902: Pres., C. B. Bratt; Sec'y, A. Rhinehart; Treas., J. A. Libbey.

C. T. HAWES, 27 years of age, a dentist at Wilmington, N. C., and graduate of the Atlanta Dental College, died from small-pox and pneumonia March 6, 1902.

E. F. STEVENS, 41 years old, a dentist at Medford, Mass., died Feb. 23, 1902, from a complication of diseases. He was a graduate of Harvard University Dental School.

DR. H. J. BURKHART, ex-president of the National Dental Association and active in all society and professional work, was this month elected mayor of his town, Batavia, N. Y.

MISSOURI EXAMINING BOARD.—The governor has appointed Dr. T. R. Hill of Hamilton, as a member of the state board of dental examiners to succeed Dr. R. B Rice, resigned.

INCOME OF FRENCH PHYSICIANS.—There are in Paris 2,600 physicians, of whom a few have very respectable incomes, but the general average is not above 3,600 francs, about $700 per annum. The whole country has 16,000 doctors, whose average income is 2,750 francs, about $550.

NEW DENTAL TERM.—"Dr. Blank, our former dentist, was here Monday. He is now attending to the molars and cuspidors of Marion."—*Denton (Ill.) Standard.*

MIDWINTER DENTAL CLINIC.—The third annual midwinter dental clinic was held at San Francisco, Feb. 26, 1902, with 250 dentists in attendance. A very enjoyable and profitable day was spent.

EPITAPH FOR A DENTIST.—The following epitaph has been found on a dentist's tombstone in an English churchyard—"Stranger, approach this tomb with gravity, John Brown is filling his last cavity."

SNOHOMISH COUNTY DENTAL ASSOCIATION.—An organization with this name was formed at Everett, Wash., Feb. 22, 1902: Pres., Dr. Saxe; V.-P., G. W. Stryker; Sec'y. Dr. Gillett; Treas., C. A. Short.

"HIS DENTIST."—Sometimes you hear a man say "my dentist" with such an air of proprietorship that you would never dream he owes the practitioner $50, which the dental gentleman never expects to get.

HENRY B. NOBLE, 70 years of age, a prominent dentist of Washington, D. C., where he had practised his profession for thirty-five years, died very suddenly from heart disease March 5, 1902, while riding to his office.

WRONG NAME.—"I don't like your heart action," said the doctor, applying the stethoscope again. "You have had some trouble with angina pectoris."

"You're partly right, doctor," sheepishly answered the young man. "Only that ain't her name."—*Exchange.*

QUACK MEDICINES IN GERMANY.—One of the measures adopted in the campaign against charlatanry being waged in Germany, is the publication in the medical journals of descriptions of the nature of the most widely advertized quack medicines.—*Jour. A. M. A.*

SOMERVILLE (MASS.) DENTAL SOCIETY.—A society with this name was organized Feb. 10, 1902, and the following officers were elected: Pres., G. L. Marshall; V.-P., G. M. Kingman; Sec'y and Treas., Georgina Crosby; Ex. Com., Geo. L. Marshall, C. E. Parkhurst, W. L. Stevens.

DISCOUNT EXTRAORDINARY.—An article has appeared in several dental journals wherein the writer, a dentist, urges the profession to buy their dental supplies in large quantities, stating that they can be procured "at from 10 to 33⅓ and sometimes from 50 to 100 per cent discount."

MINT EFFICACIOUS.—It is reported from Waco, Tex., that a seven-year-old child swallowed a silver half-dollar, causing serious symptoms. A physician was called, who promptly administered a little mint. There was an immediate change and before nightfall the child passed five silver dimes.

NEW SPECIES OF PLANT.—Once upon a time, so the story goes, a lady who was a direct lineal descendant of the original Mrs. Malaprop, was wandering through the magnificent conservatory of a Canadian nobleman. Her eye chancing to light upon a blossom which especially attracted her, she remarked: "What a beautiful specimen of the Diabetes plant!"

"Yes," answered her host, "it certainly does resemble the sweet pea."

PULLED MAN INSTEAD OF TOOTH.—A man in Kansas who was suffering from toothache started for a dentist's office, but took a few drinks beforehand to brace himself up. By the time he reached the dentist's office he was so hilariously drunk and disorderly that it was necessary to lock him up.

INSURANCE FOR BATHERS.—The latest thing in the line of insurance comes from England, where penny-in-the-slot machines have been established at bathing resorts. Upon dropping a copper coin in the slot before entering the water the bather receives in return a policy good for twenty-four hours.

REPORT YOUR EXPERIENCES.—We should like to have our readers cooperate with each other by reporting their interesting experiences through our columns. At this season dental disorders are usually prevalent, and as a special topic the dental manifestations of la grippe might be profitably discussed.

FINGER-PRINTS AND CRIME.—Mr. Francis Galton has devised a system of identifying criminals by taking an impression of the fingers in india-ink on white paper. He claims that the chance of two finger-prints being identical is less than 1 in 64,000,000, and that these lines are more enduring than any other marks of the body.

NOT A BAD PASSAGE.—A young man calling on his sweetheart for the first time since her return from abroad, inquired about the pleasure of her sea voyage.

"Were you sick both ways"? he asked, solicitously.

"No, I only vomited," demurely replied the maiden.

DAMAGES FOR ALLOWING STUDENTS TO WITNESS OPERATION.—A woman in Grand Rapids, Mich., recently sued a physician for $5,000 because he allowed medical students to witness an operation which he performed upon her. She was allowed $75 damages by a circuit court jury. It might be well for demonstrators in dental colleges to make a note of this occurrence.

"YOUR KEY DON'T FIT THIS LOCK," IKEY.—"Vat's de madder, Izzey?"

"I am in great trouble. Ve soldt a man a set of teeth mit a gold plate at four dollars down und two a veek. Und he hasn't made de second payment."

"Vy ton't you take de teeth away from him?"

"Ve can't. He's been vaccinated und got de lockjaw."—*Life.*

CLEAN FLASKS.—To prevent black oxids or rust from attacking your flasks, thoroughly clean and wash the flasks in hot, strong soapy water after using Then dry them well, place together, and set away with screw tops down so that they will be well ventilated, and you will have no trouble in keeping your flasks perfectly clean.—*T. F. Driskill*, Corsicana, Tex.

SCHOOL EXAMINATIONS CAUSE STRIFE.—The dentists of Spokane, Wash., are at war, and the trouble is due to the fact that the Board of Education issued an order that an examining board of nine dentists could examine the teeth of the school children of the city, and further stated, that "some of the most prominent and best dentists of the city will do the work." Those practitioners who are not on the examining board call the move an advertising scheme.

PLATE BREAKS DURING MASTICATION.—A physician reports a case in the *Brooklyn Medical Journal*, where a woman while eating swallowed the central portion of a vulcanite plate, the teeth belonging to same remaining in their proper position on the gums. The piece of vulcanite was removed by external esophagotomy. Did any of our readers ever hear of a similar accident?

MATCH FACTORY EMPLOYES' TEETH.—The Toledo (O.) Match Co. is having the teeth of all its employes examined, as a protection not only for the employes, but for the company against damage suits. It is of course well known that where the teeth are at all decayed they are peculiarly susceptible to the fumes of phosphorus and other chemicals used in the manufacture of matches.

BLOWS USED IN MALLETING.—Dr. John S. Engs, of Oakland, Cal., reports in the *International* that after the completion of a very large gold filling his patient, a skilled accountant, said he had been keeping a mental record of the number of blows made with the automatic mallet after each pellet of No. ⅛ gold was put in place. The number ranged from 31 to 50, with an average of 37.

HOME-MADE DENTISTRY.—The versatile correspondent of the Chicago *Inter Ocean* reports that a farmer in Kentucky is using a set of false teeth which he made himself from a piece of apple-tree root with his penknife. The teeth are perfect in shape, and the plate fits his mouth exactly. He can crack corn with this outfit, but report does not state that he can pull nails from two-inch planks, or do anything really remarkable.

SUPPORT YOUR PROFESSIONAL LITERATURE.—Beloved reader, the limited time you have for reading is too valuable to allow you to depend upon stray sample copies and commercial house organs for your professional literature. Select at least three good, up-to-date, enterprising, reliable, scientific dental journals, subscribe for them and read each one thoroughly. We will try to make the DIGEST so good that you will choose it as one of the three.

ROBBERIES.—On Feb. 23 a dentist at Milwaukee lost $15 worth of gold. On March 13 a dentist at Kankakee lost gold to the amount of $40. On Feb. 23 a dentist in Milwaukee lost $100 in currency and gold. On Feb. 19 a dentist at Waukegan, Ill., was reported to have lost $400 worth of gold and other material. On March 9 a dentist at Bakersfield, Cal., lost $250 worth of tools and gold. On Feb. 3 a dentist at Princeton, Ind., was robbed of $30 worth of material. In nearly all cases the work was done by sneak thieves and not by professionals.

NERVE.—An Irishman recently went to a doctor, who looked him over and then wrote out a prescription, telling him it would cost about $1.50 to have it filled. "Have you got that much to loan me, Doctor," asked Pat. At this the doctor took the prescription back and crossed off all the items except aqua pura. "You can get that for 10 cents," he said, handing the paper back to Pat, "and there's the dime." "Don't I have to take those things you crossed off," asked Pat. "No," replied the doctor, "those are nerve tonics, and you don't need them."

CARNEGIE'S EPITAPH.—Our readers are probably familiar with the epitaph which Carnegie wishes placed on his tombstone. It is—"Here lies a man who knew how to get around him much cleverer men than himself." One of our subscribers has juggled the words a little and thinks the result is more suitable for a dentist.—"Here lies a man who knew men much cleverer than himself, who got around him"; and that a little more transposition would make it fit the dead-beat patron—"Here lies a man who knew how to get around much cleverer men than himself."

ILLEGAL PRACTITIONERS.—On Feb. 15 a dental student at Kansas City was arrested for practising dentistry without a license. He had been attending to the practice of a dentist in that city during the latter's absence. Another student at Kansas City was arrested on Feb. 17 for practicing dentistry on his own account. Two dentists at Duluth, Minn., were locked up March 11 for the same offence. It cost two dentists in San Francisco $50 each on March 6 for failure to have a license. Finally, two dentists at Springfield, Ill., were fined $25 each on Jan. 22 because they overlooked the little formality of registering.

EASILY SWALLOWED.—"I don't know quite what the lady meant," said the physician, "but whatever it was, she meant it hard. She came to my office last week, and after considering her case I wrote a prescription which was to be put up in capsules of very large size. I explained the reason of this to her and asked if she could swallow anything so big. She looked at me in an acidulous way. 'Swallow it'! she said. 'Why, my husband belongs to two whist clubs and several lodges. Swallow it! Humph! I reckon I haven't been married ten years without learning to swallow bigger things than that.' "—*Washington Post.*

ACCIDENTS.—A dentist at Alton, Ill., on March 4 placed his vulcanizer in a wood stove to heat up. The vulcanizer exploded, blowing the stove all to pieces and setting fire to the house. The dentist was only slightly injured. A gasoline stove exploded in a dentist's laboratory at Watertown, S. D., burning him badly and setting fire to the office, on Feb. 31. On March 5 a vulcanizer in the office of a dentist at St. Joseph, Mich., exploded and wrecked the room. The cover was blown clear through the ceiling. The dentist had a narrow escape, as he had examined the vulcanizer just a moment before and then left the room.

DAMAGE SUITS.—A woman at Oshkosh, Wis., has sued her dentist to recover $22 which she claims she paid him for a set of teeth that would not fit. A man at Keokuk, Ia., has sued the dental college in that city for $1,000 damages, claiming that one of the demonstrators of the institution pulled a sound tooth by mistake. A woman in Chicago has brought suit for $10,000 damages against her dentist. She claims that he broke off a drill in one of her teeth, and she has had the tooth extracted and will exhibit it and the broken drill in court. A woman in St. Louis on March 12 recovered a judgment of $3,500 against an advertising dental parlor run by three brothers. She claimed that after paying them $30 to fix up her teeth they knocked her down and kicked her out of doors, and the jury believed her. A woman at

Indianapolis has sued her dentist for $5,000, claiming that while she was in his office last summer an electric fan fell and permanently injured her.

DENTISTRY VS. MEDICINE.—"I have always looked upon dentistry," the surgeon was saying, "as a higher branch of the mechanic arts, but it isn't a profession. What does a dentist do? He works in teeth. He is merely a skilled mechanic."

"I never could see," observed the dentist, "why surgery is considered a profession. What does a surgeon do? He works in flesh and bones. He's a thirty-third degree butcher."

Whereupon a physician joined them, and both agreed in saying he was nothing more than a glorified hospital nurse.

SUICIDES IN CHICAGO.—According to a Philadelphia newspaper, Chicago is the suicide center of the country. There were 885 suicides here last year, out of a total of 5,340 in the United States. In other words, with one-forty-fifth of the population, we have one-thirteenth of the suicides. Our Philadelphia commentator ascribes this large rate to the "fast and furious" life of the western metropolis. Chicago men ascribe it to the superb healthfulness of their town, as the only chance to escape dying of old age is to take to "sour mash" or carbolic acid. In Philadelphia when a man gets despondent he commences to drink the Schuylkill water. No wonder the death rate is high there.—*Med. Standard.*

DENTIST'S BILL FROM A LAYMAN'S STANDPOINT:—

Did you ever know a bill like a dentist's bill—
So easy to create and so difficult to kill?
Steady as the strokes from the hand of Fate,
Visit after visit doth the sum accumulate—
And the dentist forgetteth not a solitary date.
That's the way it goes. If I were in his shoes
I might be an optimist; now I have the blues,
For every dividend I draw this fellow has to share—
"'Tis money makes the mare go," but he owns the mare.

NO JOB FOR A BOY.—A dentist of our acquaintance is very skillful, but unfortunately is undersized and looks much younger than he really is. Recently two women entered his office, and after looking over him critically for a full minute they mumbled something and abruptly left the room. He was considerably annoyed and more mystified, but he was less mystified and more annoyed when he related the circumstances to a neighboring dentist, who told him the sequel. This was, that two women visited his office and after looking him over, remarked that he "would do." One of the women then took the chair and stated that she wished a molar extracted. She further remarked that she had "just called on a little sawed-off dentist who did not look strong enough to carry a cane, and who could not possibly have pulled out the teeth."

DEAFNESS.—Loss of hearing is almost invariably caused by some disease of the throat or nose or both. Recent researches in this direction have demonstrated this fact, and it is now admitted by the more advanced medi-

cal men that, aside from rupture of the eardrum, there is scarcely a symptom of defective hearing which is not traceable directly to the condition of the nose and throat. In view of the new discoveries ear specialists are finding their occupation gone, save as they make their particular branch an assistant in further investigation. It is said that the use of smelling-salts is one of the most prolific causes of deafness, operating by weakening the olfactory nerves, and through them the auditory system. All strong and pungent odors should be avoided as far as possible, especially those which act upon the secretory processes, and "make the nose run."—*Ex.*

LIGHT WANTED ON A DARK SUBJECT.—An old colored man meandered into the dental parlor, accompanied by his daughter, who was suffering from an aching molar.

"Mawnin', boss," began the old man. Ah done fotched dis hyar gal foh ter hab er tooth yanked out, sah."

"All right, uncle," said the dentist. "Shall I give her gas to deaden the pain?"

"What am dat gas gwine ter cost, sah?" queried the venerable African.

"Fifty cents," was the reply.

"Looky hyar, boss, dat am a heap ob money foh to pay out reckless," said the old fellow. "Kain't yo' all gib her er leetle gaserline foh er quartah?"

TEN TIPS ON PERFECT HEALTH.—The Chicago *Tribune* quotes the following from an apocryphal journal, "Beauty Unadorned," which is asserted to be "a periodical of physical culture": 1. Remove wet stockings before going to bed. Damp trotters induce insomnia. 2. Don't talk against the wind. It opens your trap to microbes and icy air. 3. Subscribe for "Beauty Unadorned." 4. Don't go outdoors in your pajamas immediately after exercising. 5. Sleep beside an open window and stick your feet out in the pure air. Heavy bedclothes prevent proper respiration. 6. Never lean against a hot stove. 7. Use cold water when washing your hands. It may not remove the dirt, but it prevents the hands from chapping. 8. If you cannot sleep well in a boiled shirt, buy a nightshirt. 9. Never get up in the middle of the night to buy a drink without wrapping up warm. 10. Don't wake up the bartender if you haven't the price.

SUPRARENAL EXTRACT AS AN ANTIDOTE FOR CHLOROFORM.—Dr. T. G. Brodie (*Brit. Med. Jour.*, Nov. 23, 1901), demonstrated a method by which the total work performed by the heart of an animal could be determined before and after the administration of a drug. The work was ascertained by recording the total output of the heart, made to discharge into an automatically working Stromuhr, under a pressure maintained constant by a second piece of apparatus. The total work was the product of the output multiplied by the mean pressure. Anesthetics had until then been chiefly studied. Chloroform markedly depressed the working capacity; ether, on the other hand, had but little effect unless given in very large doses. Ethylen chlorid had only a slight action. Adrenalin chlorid greatly increased the rate of the beat, and largely augmented the work performed. It was an antidote to chloroform. If administered first the heart withstood much

larger doses of the anesthetic, while a heart greatly depressed by chloroform recovered completely when adrenalin was introduced.

SYPHILIS OF THE LYMPHOID TISSUE IN THE BASE OF THE TONGUE—Dr. G. Hudson Makuen reports (*Jour. Am. Med. Assn.*) a case in which the tertiary manifestations were confined entirely to this tissue, and Dr. Casselberry in opening a discussion upon a paper which was read at the last meeting of the American Medical Association mentioned a similar case in which, from a mistaken microscopical examination, a large mass had been removed after pharyngotomy, under the supposition that it was a case of carcinoma. Dr. Stout of Philadelphia referred to a case in a trained nurse who had caught the original infection by sucking milk from an abscessed breast.

LIFE LENGTHENING.—It is estimated that the life of humanity has gained 25 per cent all the world over in the last fifty years. The lowest average that has been calculated is twenty-three years, which represents the life expectancy of the Soudanes; but even this is high when it is remembered that in Geneva in the thirteenth century fourteen years were all that were allotted to man. The United States Census in 1850 shows that 7.47 per cent of the persons who died in the previous decade were over seventy years of age; in 1860 the percentage was 7.54, and in 1880 it was 10.35. The deaths of adults have diminished in a continuous ratio, so that the proportion of infant victims to the whole number of deaths is constantly on the increase. In the United States the average longevity is fifty-five years. In England it is about forty-eight. In France during the past half century the average has gone up from thirty-eight to forty-five and one-half years.

FOOD IN THE PHARYNX.—Dr. Ed. Lavel reports four cases of suffocation following the ingestion of large morsels of food which have reached the pharynx only (*Bulletin Med.*) Two of these patients died before aid arrived. In the other two large pieces of food were rapidly removed. As a rule such bits of food lodge just at the entrance of the larynx, in the esophagus, or they may enter the larynx. In either case they occlude the respiratory passages. The food is generally a piece of insufficiently masticated meat. Suffocation occurs at once, and either dyspnea persists until help arrives, or asphyxia supervenes instantaneously. The diagnosis is easy. Prophylactically all food should be well masticated. Tracheotomy or rythmical traction of the tongue may be performed at once. The physician tries to dislocate the piece of food with his finger or a forceps. The laryngoscope will help to locate the occluding body.

DISEASES OF THE MAXILLARY ANTRUM.—Dr. W. E. Casselberry of Chicago reports two cases of serious disease of the maxillary antrum (*Laryngoscope*) and discusses the subject in its general aspects, giving a bibliography of its literature. He concludes that the diagnosis of accumulation of serum in the antrum without its distention or deformity must be based upon aspiration, the transillumination test being indecisive. The discrimination of a free collection of serum from a cyst may be quite impracticable, even when the sinus has been widely opened, and sometimes it has been impossible to determine the point even on autopsy. The treatment may consist in removing

any polypi, resecting enlarged middle turbinated bodies, removing any other obstruction of the opening of the orifice of the sinus, with due perforation for drainage. Should this fail, an opening in the anterior wall of the sinus should be made sufficiently large for palpation, and then curetting would seem to promise a cure and perhaps forestall what would ultimately become an empyema.

"XEROSTOMY"—DRYNESS OF THE MOUTH.—A. Thioly-Regard before the Swiss Odontological Society describes under the name of "xerostomy" an abnormal dryness of the oral mucous membrane. He quotes Dr. Kirstiny, who has made an exhaustive study of this pathological condition. The principal symptom of this disease is an excessive dryness of the mouth due to the absence of salivary secretion, but this condition does not necessarily imply a complete arrest of salivary secretion. The absence of saliva brings about a rapid disintegration of the teeth from carious invasion. Affliction, pain and fever are also predominant symptoms of this affection. The treatment has not been discussed, and we are in the dark as to the best means of combating this malady. Dr. Thioly-Regard affirmed that the dryness of the mouth can be caused by the use of prosthetic appliances, which in certain persons of peculiar idiosyncrasy cause intense thirst accompanied with fever. This would be caused by nervous fatigue and by the pressure of the plate against certain terminal nerve-fibers, which in turn would bring about reflex glandular disorders. Several cases of this nature have already been described, among them some by Drs. Delphin and Bardet.—*Schweizer Viertel. fur Zahn.*

NEW BONE FROM PERIOSTEUM.—J. H. Branth gives the histories of one or two cases illustrative of the fact named in the title of his paper. He says that injuries to the periosteum will often cause a necrotic condition of the underlying bone of more or less depth until the inflammatory condition and its walls form a barrier against further invasion. Quietude and healing in the part do not set in until the dead matter is ousted from the body; the dead matter, having reached the surface of the bone, often finds an especial resistance in the periosteum, and as a consequence the periosteum, besides becoming involved in the inflammatory process, is then dissected up farther from the underlying bone by the pressure of the abscess matter. Now, more bone surface is denuded and deprived of one source of nutrition, that of the periosteum, and the pyogenic germs find less resistance in the half-starved living part, the *locus minoris resistentiæ*, and more or less of the bone is involved before the inflammatory process can make its way out through the periosteum, which latter has the greater vitality. In this way it may occur that, after necrosis of a part of a bone, the periosteum, having been lifted off the bone, may deposit osseous cells on its lower surface and so build a bridge, as it were, over the necrotic substance for some distance, while at some small outlet the *debris* makes and finds its exit. The internal dead bone is the sequestrum and the newly formed bone is the involucrum. Such a condition will not permit healing until the sequestrum is removed, which Nature alone accomplishes by a slow disorganization into *debris* until it is removed through the avenues of exit.—*N. Y. Med. Jour.*

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